

## DYEING AND FINISHING TEXTILES.

### GENERAL STATISTICS.

**General character of the industry.**—The statistics presented in this report are for establishments engaged primarily in dyeing and finishing textiles. The report covers such operations as the bleaching and dyeing of stock, yarn, and cloth without regard to the kind of fiber, whether cotton, wool, silk, etc., also the mercerizing and printing or other converting of yarn and cloth, as well as the beaming, the winding of yarns, and the spooling of thread (except the winding and warping of silk).

The majority of establishments included in this industry specialize in this kind of work and instead of owning the materials, except for chemicals and dyestuffs, they are furnished by others and the work is performed on a contract or commission basis, so that the value of products for the industry represents the amount which is charged for performing the dyeing and finishing processes. In some instances, however, the goods dyed or finished are owned by the establishments which perform these final operations and under such circumstances the cost of the fabric is included in the cost of materials, while the value of the finished cloth is included in the value of products.

A considerable number of cotton, silk, and woolen mills carry on in the same establishments one or more of these subordinate processes in connection with the manufacture of textiles. Where practicable, separate returns were secured for the dyeing and finishing departments of such mills, in which case the departments were treated as separate establishments in compiling statistics for this report, and the value of products represented the cost of operating this branch of the plant.

**Comparative summary.**—The progress of the industry is shown in Table 32 for each census from 1899 to 1919, inclusive, also the percentages of increase.

**Principal states, ranked by value of products.**—Table 33 presents the more important statistics of the in-

dustry, by states. The states shown in the table are given their actual ranking among all states, the rank of certain states for which figures can not be presented being higher than that of some of those named.

**Persons engaged in the industry.**—Statistics relating to the number of male and female employees distributed according to class of employment are shown in Table 34 for 1919, 1914, and 1909, together with the per cent that each sex forms of the total for each class.

**Wage earners, by months, for selected states.**—The number of wage earners according to sex and state is shown in Table 35 by months for the year 1919. The total number of wage earners employed in the industry is shown by months for 1919, 1914, and 1909.

**Prevailing hours of labor.**—Table 36 shows the increase in the number of wage earners and the shortening of the working day since 1909.

**Size of establishments, by average number of wage earners.**—Table 37 shows the size of establishments as measured by the average number of wage earners employed in the industry as a whole and for the leading states.

**Size of establishments, by value of products.**—The size of establishments based on value of products may be found by reference to Table 38, which is comparative for 1919, 1914, and 1909.

**Character of ownership.**—The number of establishments, by character of ownership, with corresponding value of products for 1919 and 1914, is shown for selected states in Table 39.

**Number and horsepower of types of prime movers.**—The various types of power, both owned and rented, used in the industry during 1919, 1914, and 1909 are shown in Table 40 with figures for the number and horsepower of each type.

**Fuel consumed.**—Table 41 gives the quantity of the various kinds of fuel used in dyeing and finishing textiles, by states, for 1919 and 1914.

## MANUFACTURES.

TABLE 32.—COMPARATIVE SUMMARY: 1919, 1914, 1909, 1904, AND 1899.

	1919	1914	1909	1904	1899	PER CENT OF INCREASE.			
						1914-1919	1909-1914	1904-1909	1899-1904
Number of establishments.....	628	507	426	360	298	23.9	19.0	18.3	20.8
Persons engaged.....	62,588	53,273	47,303	38,071	31,394	17.5	12.6	24.2	21.3
Proprietors and firm members.....	363	353	318	310	300	2.8	11.0	2.6	3.3
Salaried employees.....	6,240	4,453	2,939	2,196	1,318	40.1	51.5	33.8	66.6
Wage earners (average number).....	55,985	48,467	44,046	35,565	29,770	15.5	10.0	23.8	19.4
Primary horsepower.....	160,430	130,172	107,740	84,868	69,238	23.2	20.8	27.0	22.6
Capital.....	\$229,948,486	\$139,193,871	\$114,092,054	\$88,708,576	\$60,043,104	65.2	22.0	28.6	46.3
Salaries and wages.....	73,441,533	31,343,723	26,261,634	18,876,586	14,993,444	134.3	19.4	39.1	25.9
Salaries.....	10,251,565	6,471,405	5,034,710	3,407,381	2,267,128	151.1	28.5	47.8	50.3
Wages.....	57,189,978	24,872,318	21,226,924	15,469,205	12,726,316	129.9	17.2	37.2	21.6
Paid for contract work.....	1,361,486	222,370	337,422	92,885	41,735	512.3	-34.1	263.3	122.6
Rent and taxes.....	14,710,308	1,412,795	847,216	2,812,903	2,427,049	941.2	66.8	.....	.....
Cost of materials.....	174,742,815	56,705,135	35,261,301	19,621,253	17,958,137	208.2	60.8	79.7	9.3
Value of products.....	323,967,683	109,291,536	83,556,432	50,849,545	44,963,331	196.4	30.8	64.3	13.1
Value added by manufacture <sup>a</sup> .....	149,224,868	52,536,401	48,295,131	31,228,292	27,005,194	183.8	8.9	54.7	15.0

<sup>a</sup> A minus sign (-) denotes decrease.<sup>b</sup> Exclusive of internal revenue.<sup>c</sup> Value of products less cost of materials.

TABLE 33.—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
		Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.
United States.....	628	55,985	100.0	.....	\$323,968	100.0	.....	\$149,225	100.0	.....
New Jersey.....	132	14,492	25.9	1	79,305	24.5	1	35,083	23.5	1
Massachusetts.....	92	12,321	22.0	2	75,262	23.2	2	31,052	20.8	2
New York.....	133	6,076	10.9	5	44,694	13.8	3	20,515	13.7	5
Pennsylvania.....	163	7,381	13.2	4	42,475	13.1	4	22,760	15.3	3
Rhode Island.....	67	9,319	16.6	3	42,258	13.0	5	21,331	14.3	4
Connecticut.....	16	1,918	3.4	6	8,350	2.6	7	4,900	3.3	6
Illinois.....	11	403	0.7	10	2,219	0.7	10	1,124	0.8	9
Ohio.....	6	339	0.6	12	1,514	0.5	11	769	0.5	12
North Carolina.....	8	414	0.7	9	1,243	0.4	12	501	0.3	14
All other states.....	30	3,322	5.9	.....	26,648	8.2	.....	11,190	7.5	.....

TABLE 34.—PERSONS ENGAGED IN THE INDUSTRY: 1919, 1914, AND 1909.

CLASS.	Cen- sus year.	Total.	Male.	Fe- male.	PER CENT OF TOTAL.		CLASS.	Cen- sus year.	Total.	Male.	Fe- male.	PER CENT OF TOTAL.	
					Male.	Fe- male.						Male.	Fe- male.
All classes.....	1919	62,588	47,531	15,057	75.9	24.1	Clerks and other subordinate salaried employees.	1919	4,165	2,472	1,693	59.4	40.6
	1914	53,273	43,694	9,619	81.9	18.1		1914	3,311	2,444	867	73.8	26.2
	1909	47,303	38,581	8,722	81.6	18.4		1909	2,039	1,595	444	78.2	21.8
Proprietors and officials.....	1919	2,438	2,354	84	96.6	3.4	Wage earners (average number)....	1919	55,985	42,705	13,280	76.3	23.7
	1914	1,495	1,460	35	97.7	2.3		1914	48,467	39,750	8,717	82.0	18.0
	1909	1,218	1,190	28	97.7	2.3		1909	44,046	35,796	8,250	81.3	18.7
Proprietors and firm members.	1919	363	353	10	97.2	2.8	16 years of age and over.....	1919	54,877	42,073	12,804	76.7	23.3
	1914	353	338	15	95.8	4.2		1914	47,692	39,221	8,471	82.2	17.8
	1909	318	308	10	96.9	3.1		1909	43,002	35,057	7,945	81.5	18.5
Salaried officers of corporations.	1919	757	710	47	93.8	6.2	Under 16 years of age.....	1919	1,108	632	476	57.0	43.0
	1914	424	412	12	97.2	2.8		1914	775	529	246	68.3	31.7
	1909	289	287	2	99.3	0.7		1909	1,044	739	305	70.8	29.2
Superintendents and managers.	1919	1,318	1,291	27	98.0	2.0							
	1914	718	710	8	98.9	1.1							
	1909	611	595	16	97.4	2.6							

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TABLE 35.—WAGE EARNERS, BY MONTHS, FOR SELECTED STATES: 1919.

[The month of maximum employment is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
United States:														
1919.....	55,985	53,761	51,688	51,262	<i>51,052</i>	53,144	55,422	57,833	58,153	57,086	58,727	61,102	62,500	81.6
Males.....	42,705	40,676	39,006	<i>38,836</i>	39,061	40,779	42,617	44,376	44,472	43,351	44,824	46,608	47,857	81.1
Females.....	13,280	13,085	12,682	12,427	<i>11,991</i>	12,365	12,805	13,457	13,681	13,735	13,903	14,499	14,733	81.4
1914.....	48,467	49,059	50,360	51,070	50,815	49,681	49,291	47,015	46,981	48,007	47,662	45,259	45,501	88.6
1909.....	44,046	43,715	44,299	44,863	44,635	43,840	43,405	<i>43,212</i>	43,447	44,171	44,031	44,797	44,167	96.3
Connecticut.....	1,918	<i>1,444</i>	1,592	1,016	1,681	1,777	1,917	2,051	2,088	2,083	2,210	2,262	2,295	62.9
Illinois.....	403	<i>458</i>	478	411	418	393	380	361	369	361	400	404	413	75.1
Massachusetts.....	12,321	12,043	10,908	<i>10,800</i>	10,860	11,508	12,264	12,850	13,077	13,148	12,854	13,609	13,931	77.5
New Jersey.....	14,402	14,359	14,082	14,470	13,787	14,191	14,491	15,155	14,301	<i>13,166</i>	14,720	15,285	15,907	82.7
New York.....	6,076	5,726	<i>6,612</i>	5,673	5,671	5,633	5,795	6,235	6,392	6,446	6,448	6,647	6,734	83.3
Pennsylvania.....	7,381	6,761	6,643	<i>6,395</i>	6,665	7,018	7,394	7,671	7,944	7,623	7,782	8,314	8,362	76.5
Rhode Island.....	9,319	9,138	8,680	<i>8,244</i>	8,429	8,825	9,149	9,352	9,673	9,885	9,898	10,145	10,440	78.7

TABLE 36.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR SELECTED STATES: 1919 AND 1914.

STATE.	Cen- sus year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—								STATE.	Cen- sus year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—							
			44 and un- der.	Be- tween 44 and 48.	48. <sup>1</sup>	Be- tween 48 and 54.	54.	Be- tween 54 and 60.	60.	Over 60.				44 and un- der.	Be- tween 44 and 48.	48. <sup>1</sup>	Be- tween 48 and 54.	54.	Be- tween 54 and 60.	60.	Over 60.
United States.	1919	55,985	11,168	819	18,634	7,317	10,482	6,748	671	146	1914	48,467	(2)	(2)	557	2,769	10,186	23,695	5,226	34	
	1909	44,046	(2)	(2)	107	1,102	398	28,172	12,639	1,628											
Connecticut.....	1919	1,918	.....	.....	790	47	655	233	150	43	1914	1,764	(2)	(2)	12	2	1,048	102	.....	.....	
	1914	1,764	(2)	(2)	12	.....	2	1,048	102	.....											
Illinois <sup>3</sup> .....	1919	403	47	.....	257	17	51	31	.....	.....											
Massachusetts....	1919	12,321	186	.....	8,559	877	1,540	1,013	43	103	1914	11,437	(2)	(2)	19	157	5,573	5,510	144	34	
	1914	11,437	(2)	(2)	19	.....	.....	.....	.....	.....											
New Jersey.....	1919	14,492	8,957	40	902	2,154	712	1,035	2	.....	1914	11,083	(2)	(2)	7	912	159	9,203	1,402	.....	
New York.....	1919	6,076	1,058	730	2,548	1,212	146	370	12	.....	1914	5,514	(2)	(2)	246	439	2,914	951	964	.....	
	1914	5,514	(2)	(2)	246	439	2,914	951	964	.....											
Pennsylvania.....	1919	7,381	889	46	2,076	2,007	1,157	973	233	.....	1914	6,389	(2)	(2)	184	166	1,301	3,097	1,641	.....	
	1914	6,389	(2)	(2)	184	166	1,301	3,097	1,641	.....											
Rhode Island.....	1919	9,319	.....	3	2,850	717	4,325	1,424	.....	.....	1914	7,028	(2)	(2)	3	832	5,862	972	259	.....	
	1914	7,028	(2)	(2)	3	832	5,862	972	259	.....											

<sup>1</sup> Includes 48 and under for 1914 and 1909.

<sup>2</sup> Corresponding figures not available.

<sup>3</sup> Not reported separately in 1914.

TABLE 37.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR STATES: 1919.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—																	
	Estab-lish-ments.	Wage earners (average number).	No wage earners.		1 to 5 wage earners, inclusive.		6 to 20 wage earners, inclusive.		21 to 50 wage earners, inclusive.		51 to 100 wage earners, inclusive.		101 to 250 wage earners, inclusive.		251 to 500 wage earners, inclusive.		501 to 1,000 wage earners, inclusive.		Over 1,000 wage earners.	
			Establish-ments.	Wage earners.	Establish-ments.	Wage earners.	Establish-ments.	Wage earners.	Establish-ments.	Wage earners.	Establish-ments.	Wage earners.	Establish-ments.	Wage earners.	Establish-ments.	Wage earners.	Establish-ments.	Wage earners.	Establish-ments.	Wage earners.
United States...1910..	628	55,985	11	106	292	178	2,136	141	4,662	69	5,010	68	10,264	29	10,330	19	12,594	7	10,707	
1914..	507	48,467	7	83	270	160	2,072	100	3,064	49	3,308	54	8,590	22	7,748	18	11,247	8	11,502	
Connecticut.....	16	1,918	.....	3	14	2	24	5	166	3	209	1	219	.....	.....	2	1,286	.....	.....	
Illinois.....	11	403	.....	4	10	2	17	4	170	.....	826	1	206	.....	.....	.....	3,828	.....	.....	
Massachusetts.....	62	12,321	.....	8	20	8	111	9	297	11	829	12	1,770	6	2,110	6	3,828	2	3,356	
New Jersey.....	132	14,492	1	22	61	29	367	38	1,177	14	964	16	2,304	6	2,058	5	3,206	8	4,356	
New York.....	133	6,076	8	29	79	54	620	22	764	6	480	7	1,040	6	2,102	1	801	.....	.....	
Pennsylvania.....	163	7,381	2	28	76	57	716	46	1,505	16	1,162	8	1,132	4	1,496	2	1,204	.....	.....	
Rhode Island.....	67	9,319	.....	6	14	16	209	10	307	11	816	14	2,206	6	2,012	3	2,019	1	1,730	

## MANUFACTURES.

TABLE 38.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919, 1914, AND 1909.

VALUE OF PRODUCT.	NUMBER OF ESTABLISHMENTS.			AVERAGE NUMBER OF WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
	1919	1914	1909	1919	1914	1909	1919	1914	1909	1919	1914	1909
All classes.....	628	507	426	55,985	48,467	44,046	\$323,967,683	\$109,291,536	\$83,556,432	\$149,224,868	\$52,586,401	\$48,295,131
Less than \$5,000.....	28	48	33	71	129	86	93,876	141,421	109,788	66,773	107,955	84,775
\$5,000 to \$20,000.....	85	100	89	414	886	743	950,125	1,212,588	1,070,228	671,371	842,050	792,475
\$20,000 to \$100,000.....	180	195	165	2,035	5,360	4,428	9,800,201	10,122,651	7,663,519	5,791,815	5,390,193	4,638,022
\$100,000 to \$500,000.....	206	116	114	10,605	22,034	21,798	47,995,838	28,594,862	37,395,345	25,504,006	23,205,327	22,415,860
\$500,000 to \$1,000,000.....	64	23	20	10,026	22,034	21,798	44,826,110	15,868,560	37,395,345	23,032,535	23,040,876	20,363,999
\$1,000,000 and over.....	65	25	20	31,934	20,078	16,901	220,292,443	55,351,454	37,308,652	93,257,768	23,040,876	20,363,999
PER CENT DISTRIBUTION.												
All classes.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than \$5,000.....	4.5	9.5	8.9	0.1	0.3	0.2	( <sup>1</sup> )	0.1	0.1	( <sup>1</sup> )	0.2	0.2
\$5,000 to \$20,000.....	13.5	19.7	20.9	0.7	1.8	1.7	0.3	1.1	1.3	0.4	1.6	1.6
\$20,000 to \$100,000.....	28.7	38.5	38.7	5.2	11.1	10.1	3.0	9.3	9.2	3.9	10.3	9.6
\$100,000 to \$500,000.....	32.8	22.9	20.8	18.9	45.5	49.5	14.8	24.3	44.8	17.1	44.1	46.4
\$500,000 to \$1,000,000.....	10.2	4.5	4.7	17.9	45.5	49.5	13.8	14.5	44.8	16.0	44.1	46.4
\$1,000,000 and over.....	10.4	4.9	4.7	57.1	41.4	38.6	68.0	50.6	44.6	62.5	43.8	42.2

<sup>1</sup> Less than one-tenth of 1 per cent.

TABLE 39.—CHARACTER OF OWNERSHIP, FOR SELECTED STATES: 1919 AND 1914.

STATE.	Census year.	NUMBER OF ESTABLISHMENTS OWNED BY—			AVERAGE NUMBER OF WAGE EARNERS.			VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
		Indi-vid-u-als.	Cor-pora-tions.	All oth-ers.	Total.	In establishments owned by—			Total.	Of establishments owned by—			Per cent of total.
						Indi-vid-u-als.	Cor-pora-tions.	All oth-ers.		Indi-vid-u-als.	Cor-pora-tions.	All oth-ers.	
United States....	1919	132	400	96	55,985	1,918	48,874	5,193	\$323,967,683	\$11,439,672	\$268,058,455	\$44,469,556	3.5
	1914	134	276	97	48,467	4,276	41,219	2,972	109,291,536	7,971,546	94,193,033	7,126,957	7.3
	1909	123	214	89	44,046	3,166	38,397	2,483	83,556,432	5,502,502	72,248,551	5,805,379	6.6
Connecticut <sup>1</sup> .....	1919	1	14	1	1,918	1,918	338	15	8,350,098	8,350,098	2,147,035	72,074	100.0
Illinois <sup>1</sup> .....	1919	1	8	2	403	403	207	15	2,219,109	2,219,109	2,147,035	72,074	96.8
Massachusetts.....	1919	6	52	4	12,321	224	11,207	890	75,281,815	1,268,201	61,998,544	11,095,070	1.7
	1914	7	45	5	11,437	244	10,376	817	22,455,086	347,305	20,149,734	1,958,047	1.5
New Jersey.....	1919	22	95	15	14,492	313	13,958	221	79,305,174	1,136,132	76,365,621	1,803,421	1.4
	1914	20	65	13	11,683	356	10,821	476	27,986,512	602,055	26,576,945	807,512	2.2
New York.....	1919	41	69	23	6,076	297	5,416	363	44,693,507	3,866,332	37,825,987	3,001,188	8.7
	1914	34	43	22	5,514	356	4,784	364	16,302,576	1,167,960	15,850,983	1,283,733	7.2
Pennsylvania.....	1919	51	73	39	7,381	824	5,644	913	42,475,000	4,001,120	30,716,416	7,757,464	9.4
	1914	50	53	47	6,389	899	4,346	1,144	16,451,576	1,556,282	11,273,668	2,621,620	10.1
Rhode Island.....	1919	6	55	6	9,319	152	6,712	2,455	42,257,545	496,129	32,176,248	9,595,168	1.2
	1914	12	32	3	7,923	2,194	5,721	13	16,300,783	3,969,996	12,309,842	20,945	24.4

<sup>1</sup> Figures not available for 1914.<sup>2</sup> Includes the groups "Individuals" and "All others."<sup>3</sup> Includes the group "Individuals."

TABLE 40.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919, 1914, AND 1909.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.					
	1919	1914	1909	Amount.			Per cent distribution.		
				1919	1914	1909	1919	1914	1909
Primary power, total.....	5,556	2,694	2,181	160,430	130,172	107,746	100.0	100.0	100.0
Owned.....	2,150	1,064	1,990	133,864	122,165	103,605	83.4	93.8	95.2
Steam.....	2,042	1,868	1,893	118,107	111,506	92,284	73.7	85.7	85.6
Engines.....	1,963	( <sup>2</sup> )	( <sup>2</sup> )	85,899	( <sup>2</sup> )	( <sup>2</sup> )	53.6	.....	.....
Turbines.....	79	( <sup>2</sup> )	( <sup>2</sup> )	32,298	( <sup>2</sup> )	( <sup>2</sup> )	20.1	.....	.....
Internal-combustion engines.....	28	32	20	2,124	690	1,207	1.3	0.5	1.1
Water wheels, turbines, and motors.....	80	64	77	13,543	9,969	10,114	8.4	7.7	9.4
Rented.....	3,506	730	191	26,566	8,007	4,141	16.6	6.2	3.8
Electric.....	3,506	730	191	25,993	7,162	2,665	16.2	5.5	2.5
Other.....	.....	.....	.....	573	845	1,476	0.4	0.7	1.3
Electric.....	9,064	4,249	1,419	85,889	51,021	24,011	100.0	100.0	100.0
Rented.....	3,506	730	191	25,993	7,162	2,665	30.3	14.0	11.1
Generated by establishments reporting.....	5,558	3,519	1,228	59,896	43,859	21,346	69.7	86.0	88.9

<sup>1</sup> Figures for horsepower include for 1909 the amount reported under the head of "Other" owned power.<sup>2</sup> Not reported separately.



# DYEING AND FINISHING TEXTILES.

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TABLE 41.—FUEL CONSUMED, BY STATES: 1919 AND 1914.

STATE.	Cen- sus year.	COAL.		Coke (tons, 2,000 pounds).	Fuel oils (bar- rels).	Gasoline and other vola- tile oils (bar- rels).	Gas (1,000 cubic feet).	STATE.	Cen- sus year.	COAL.		Coke (tons, 2,000 pounds).	Fuel oils (bar- rels).	Gasoline and other vola- tile oils (bar- rels).	Gas (1,000 cubic feet).
		An- thracite (tons, 2,240 pounds).	Bitu- minous (tons, 2,000 pounds).							An- thracite (tons, 2,240 pounds).	Bitu- minous (tons, 2,000 pounds).				
United States.....	1919	442,855	1,071,156	13,624	393,328	6,930	516,218	New York.....	1919	43,769	81,038	6	1,043	3,023	25,834
	1914	490,587	896,589		31,859	(1)	143,953		1914	46,883	80,306		690	(1)	21,025
Connecticut.....	1919	2,585	55,096	12,231	282			North Carolina.....	1919		9,856				
	1914	20	56,849		1,570	(1)	1,609		1914		3,620				
Illinois.....	1919		10,567		7	(1)	823	Ohio.....	1919		20,328				3,239
	1914		10,053				364		1914		26,032				11,000
Kentucky.....	1919		6,032			75		Pennsylvania.....	1919	43,773	100,984	480	28,034	750	5,537
	1914		7,566						1914	77,860	142,182		252	(1)	23,097
Maryland.....	1919		2,648					Rhode Island.....	1919	20,447	188,649	713	107,739	1,785	342,214
	1914	30	2,330		1				1914	55,906	198,251		18,790	(1)	8,832
Massachusetts.....	1919	44,023	231,339		239,873	44	18,328	All other states.....	1919		86,132		916	141	35,225
	1914	57,855	234,654		1,174	(1)	9,583		1914		69,063		6,905	(1)	14,364
New Jersey.....	1919	279,258	179,487	194	15,941	1,112	85,018								
	1914	252,024	85,683		2,390	(1)	54,078								

1 Included in figures for fuel oils.

## GENERAL TABLES.

Comparative summary, by states.—Table 42 shows number of establishments, average number of wage earners, primary horsepower, wages, cost of materials, and value of products for 1919, 1914, and 1909.

Detailed statement, by states.—Table 43 presents, for 1919, statistics in detail for the industry for each state that can be shown without disclosing the operations of individual establishments.

TABLE 42.—COMPARATIVE SUMMARY, BY STATES: 1919, 1914, AND 1909.

STATE.	Cen- sus year.	Number of estab- lish- ments.	Wage earners (aver- age num- ber).	Pri- mary horse- power.	Wages.	Cost of mate- rials.	Value of prod- ucts.	STATE.	Cen- sus year.	Number of estab- lish- ments.	Wage earners (aver- age num- ber).	Pri- mary horse- power.	Wages.	Cost of mate- rials.	Value of prod- ucts.						
																Expressed in thousands.			Expressed in thousands.		
United States.....	1919	628	55,985	160,430	\$57,190	\$174,743	\$323,968	North Carolina.....	1919	8	414	1,431	\$229	\$741	\$1,243						
	1914	507	48,487	130,172	24,872	56,705	109,292		1914	4	194	273	61	106	208						
	1909	426	44,046	107,746	21,227	35,261	83,556		1909	4	330	556	86	113	307						
Connecticut.....	1919	16	1,918	9,427	2,234	3,450	8,350	Ohio.....	1919	6	330	3,551	383	744	1,514						
	1914	12	1,764	7,738	928	1,455	3,503		1914	5	382	4,100	191	444	706						
	1909	10	1,719	6,851	872	1,480	3,562		1909	6	184	4,578	94	243	423						
Illinois.....	1919	11	403	745	373	1,095	2,219	Pennsylvania.....	1919	168	7,381	18,140	8,121	19,715	42,475						
	1914	8	268	476	149	208	504		1914	150	6,389	14,685	3,409	8,456	15,452						
	1909	12	172	386	92	105	363		1909	135	6,086	13,560	2,988	5,331	12,069						
Massachusetts.....	1919	62	12,321	30,133	12,241	44,210	75,262	Rhode Island.....	1919	67	9,319	28,920	9,357	20,927	42,258						
	1914	57	11,437	30,932	5,843	10,989	22,455		1914	47	7,928	25,539	3,966	8,764	16,301						
	1909	48	9,079	24,513	4,430	10,469	21,893		1909	45	7,792	21,179	3,616	5,310	13,056						
New Jersey.....	1919	132	14,492	28,703	14,932	44,222	79,305	All other states.....	1919	30	3,322	13,230	3,153	15,461	26,649						
	1914	98	11,683	22,876	5,926	13,706	27,937		1914	27	2,908	10,066	1,419	2,125	5,878						
	1909	67	10,120	19,939	5,016	6,353	15,796		1909	18	3,303	8,384	1,712	1,709	5,524						
New York.....	1919	133	6,076	17,150	6,167	24,178	44,693														
	1914	99	5,514	13,497	2,925	10,452	16,303														
	1909	81	5,252	8,750	2,321	4,139	9,673														

## MANUFACTURES.

TABLE 43.—DETAILED STATEMENT, BY STATES: 1919.

STATE.	Number of establishments	PERSONS ENGAGED IN THE INDUSTRY.								WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.				EXPENSES.			
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks, etc.		Wage earners.			Total.	16 and over.		Under 16.		Capital.	Salaries and wages.	
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.	Female.		Officials.	Clerks, etc.
								Maximum month.	Minimum month.								
United States.....	628	62,588	363	2,075	2,472	1,693	55,985	De 62,590	Ap 51,052	62,462	47,132	14,098	708	524	\$229,048,486	\$10,565,608	\$5,685,947
Connecticut.....	16	2,062	3	48	48	45	1,918	De 2,295	Ja 1,444	2,300	1,901	325	56	18	8,626,670	360,630	108,080
Illinois.....	11	497	5	29	32	28	403	Fe 478	Ar 359	413	191	218	2	2	1,641,958	160,077	94,783
Massachusetts.....	62	13,389	13	379	322	354	12,321	De 13,931	Mh 10,800	13,788	10,414	3,117	153	102	53,279,255	1,822,530	830,747
New Jersey.....	132	16,062	58	566	591	355	14,402	De 15,907	Se 13,156	15,687	11,900	3,435	170	170	47,239,046	3,145,522	1,206,251
New York.....	133	7,316	95	349	524	272	6,070	De 6,734	Fe 5,612	6,840	4,688	2,135	10	7	26,434,445	1,449,206	1,079,584
North Carolina.....	8	454	4	26	3	7	414	De 482	Je 381	482	281	194	3	4	1,445,362	51,557	8,550
Ohio.....	6	367	-----	14	8	6	339	Se 373	Fe 300	377	316	61	-----	-----	2,108,425	37,744	31,696
Pennsylvania.....	163	8,290	142	266	311	190	7,351	De 8,362	Mh 6,395	8,399	6,700	1,557	85	57	29,805,844	1,875,048	702,656
Rhode Island.....	67	10,507	25	305	510	348	9,319	De 10,440	Mh 8,214	10,472	8,122	2,131	142	77	30,960,365	1,294,391	1,348,985
All other states <sup>1</sup> .....	30	3,644	18	93	123	88	3,322	.....	.....	3,706	2,619	925	81	81	14,407,116	368,993	274,485

STATE.	EXPENSES—continued.						Value of products.	Value added by manufacture.	POWER.							
	Salaries and wages—Continued.	For contract work.	Rent and taxes.		For materials.				Primary horsepower.					Electric horsepower generated in establishments reporting.		
			Wage earners.	Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.			Fuel and rent of power.	Total.	Owned.					
											Steam engines (not turbines).	Steam turbines.	Internal-combustion engines.	Water power. <sup>2</sup>	Rent. <sup>3</sup>	
United States.....	\$57,189,978	\$1,361,486	\$838,575	\$13,571,733	\$164,314,521	\$10,428,294	\$323,967,683	\$149,224,668	160,430	85,809	32,298	2,124	13,543	26,566	59,896	
Connecticut.....	2,233,708	-----	4,401	564,305	3,043,674	406,445	8,350,098	4,899,979	9,427	3,279	628	-----	3,850	1,670	1,810	
Illinois.....	373,698	89	14,244	56,169	1,093,507	61,183	2,219,109	1,124,419	745	548	-----	-----	-----	197	-----	
Massachusetts.....	12,240,747	22,722	12,930	4,594,062	41,845,090	2,363,839	75,261,815	31,052,277	39,133	13,613	14,259	-----	2,305	8,956	18,146	
New Jersey.....	14,981,768	508,713	125,875	2,363,181	41,712,221	2,509,779	79,305,174	35,083,174	28,703	22,069	3,294	226	50	3,064	12,548	
New York.....	6,166,676	236,842	297,066	1,623,739	23,306,878	871,608	44,693,507	20,515,121	17,150	5,826	5,186	168	2,710	3,262	6,162	
North Carolina.....	229,208	-----	200	28,217	680,222	61,300	1,242,579	501,057	1,431	90	825	-----	-----	516	610	
Ohio.....	383,650	-----	5,118	16,494	661,524	82,878	1,518,608	769,206	3,551	3,400	-----	-----	-----	151	511	
Pennsylvania.....	8,120,917	477,192	234,733	1,268,389	18,174,670	1,539,901	42,475,000	22,760,429	18,140	13,850	920	32	45	3,293	3,241	
Rhode Island.....	9,356,637	25,791	105,620	2,773,589	18,901,077	2,025,663	42,257,545	21,330,805	28,020	16,733	4,951	1,685	2,374	3,177	14,902	
All other states <sup>1</sup> .....	3,153,049	137	37,488	683,498	14,955,049	505,798	26,649,248	11,188,401	13,230	6,491	2,235	15	2,209	2,280	1,968	

<sup>1</sup> All other states embrace: Alabama, 1 establishment; California, 2; Delaware, 2; Florida, 1; Indiana, 2; Kentucky, 3; Maine, 1; Maryland, 3; Michigan, 1; Minnesota, 3; Missouri, 2; New Hampshire, 1; South Carolina, 3; Tennessee, 2; West Virginia, 1; and Wisconsin, 2.

<sup>2</sup> Includes water wheels, turbines, and water motors (irrespective of ownership of water supply).

<sup>3</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants).

# FLAX AND HEMP, DRESSED.

General character of the industry.—Establishments included in this classification are engaged in separating the woody portion of the straw from the fiber, a combined process of decay and mechanical treatment technically known as retting, breaking, scutching, and hackling. The product of these establishments is line, or fiber, used principally in the manufacture of cordage and twine. A certain amount of tow, or waste, a natural by-product of the process of dressing, is also

reported as a product. This industry is principally located in three states—Kentucky with 3 establishments, reporting \$546,648 as value of products; Wisconsin, 7 establishments, reporting \$425,298; and Michigan, 4 establishments, reporting \$184,208.

Comparative summary and detailed statement.—Table 44 presents statistics for the industry for each census from 1899 to 1919, inclusive; and Table 45 shows detailed statistics, by states.

TABLE 44.—COMPARATIVE SUMMARY: 1919, 1914, 1909, 1904, AND 1899.

	1919	1914	1909	1904	1899	PER CENT OF INCREASE. <sup>1</sup>			
						1914-1919	1909-1914	1904-1909	1899-1904
Number of establishments.....	20	16	16	17	4				
Persons engaged.....	491	158	216	246	231	210.8	-25.9	-12.2	6.5
Proprietors and firm members.....	26	19	22	17	8				
Salaried employees.....	45	23	30	15	12				
Wage earners (average number).....	420	116	164	214	211	262.1	-29.3	-23.4	1.4
Primary horsepower.....	1,920	832	1,147	600	187	130.8	-27.5	91.2	220.9
Capital.....	\$2,783,958	\$234,619	\$784,771	\$238,842	\$71,496	1,086.6	-70.1	228.6	234.1
Salaries and wages.....	534,964	60,601	92,707	69,363	52,589	782.8	-34.6	33.7	31.9
Salaries.....	87,591	15,330	28,700	9,386	6,589	471.4	-46.6	205.8	42.4
Wages.....	447,373	45,271	64,007	59,977	46,000	888.2	-29.3	6.7	30.4
Paid for contract work.....	1,146			1,100					
Rent and taxes.....	19,081	3,280	5,636	24,607	2,685	481.7	-41.8	22.3	572.6
Cost of materials.....	1,708,870	185,247	336,300	233,132	91,032	822.4	-44.9	44.3	156.1
Value of products.....	2,369,114	282,648	467,346	346,963	158,650	738.2	-39.5	34.7	118.7
Value added by manufacture <sup>2</sup> .....	660,444	97,401	131,046	113,831	67,618	578.1	-25.7	15.1	68.3

<sup>1</sup> A minus sign (—) denotes decrease; percentages are not shown where base is less than 100.

<sup>2</sup> Exclusive of internal revenue.

<sup>3</sup> Value of products less cost of materials.

TABLE 45.—DETAILED STATEMENT, BY STATES: 1919.

STATE.	Number of establishments.	PERSONS ENGAGED IN THE INDUSTRY.									WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Capital.	EXPENSES.	
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks, etc.		Wage earners.			Total.	16 and over.		Under 16.		Officials.		Clerks, etc.	
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.	Female.				
								Maximum month.	Minimum month.									
United States.....	20	491	26	24	14	7	420	Dec	514	Jan	350	538	493	44	1	\$2,783,958	\$61,001	\$26,590
Michigan.....	4	44	3	3	1	40	Dec	53	July	27	53	53	.....	.....	.....	147,515	8,151	1,402
Wisconsin.....	7	131	14	13	3	98	Dec	126	July	55	137	104	32	1	.....	605,792	23,883	3,578
All other states <sup>1</sup> .....	9	316	12	8	11	3	282	.....	.....	.....	.....	348	336	12	.....	2,030,651	28,997	21,610

STATE.	EXPENSES—continued.						Value of products.	Value added by manufacture.	POWER.					Electric horsepower generated in establishments reporting.
	Salaries and wages—Con.	For contract work.	Rent and taxes.		For materials.				Primary horsepower.					
			Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.			Total.	Owned.		Water power. <sup>2</sup>	Rented. <sup>1</sup>	
										Steam engines and turbines.	Internal combustion engines.			
United States.....	\$447,373	\$1,146	\$1,405	\$17,676	\$1,652,874	\$55,796	\$2,369,114	\$660,444	1,920	1,455	80	.....	385	10
Michigan.....	31,963	.....	.....	970	135,213	1,304	184,208	47,691	48	.....	.....	.....	48	.....
Wisconsin.....	101,137	.....	.....	6,876	240,468	5,762	425,293	179,063	815	550	.....	.....	265	.....
All other states <sup>1</sup> .....	314,273	1,146	1,405	9,830	1,277,193	48,730	1,769,613	433,690	1,067	905	80	.....	72	10

<sup>1</sup> All other states embrace: California, 1 establishment; Illinois, 1; Indiana, 1; Kentucky, 3; Minnesota, 1; North Dakota, 1; Oregon, 1.

<sup>2</sup> Includes water wheels and turbines (irrespective of ownership of water supply), and water motors (operated by water from city mains).

<sup>3</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants).

# HAIRCLOTH.

General character of the industry.—Establishments engaged in this industry weave haircloth principally from a cotton warp with a horsehair filling, although some haircloth is made entirely from hair. The principal use of haircloth is for upholstering purposes in covering seats and backs of furniture or as a stiffening in the manufacture of clothing. Of the 18 estab-

lishments reporting in 1919, 14 were located in the state of Pennsylvania and reported \$2,791,676 as value of products.

Comparative summary and detailed statement.—Table 45 presents statistics relating to the haircloth industry for the years 1919, 1914, and 1909; and Table 47 shows detailed statistics, by states.

TABLE 46.—COMPARATIVE SUMMARY: 1919, 1914, AND 1909.

	1919	1914	1909	PER CENT OF INCREASE. <sup>1</sup>			1919	1914	1909	PER CENT OF INCREASE. <sup>1</sup>	
				1914-1919	1909-1914					1914-1919	1909-1914
Number of establishments.....	18	19	14	.....	.....	Salaries and wages.....	\$500,059	\$388,907	\$323,808	46.3	20.1
Persons engaged.....	511	674	621	-24.2	8.5	Salaries.....	143,910	98,027	71,529	45.9	37.9
Proprietors and firm members.....	19	22	11	.....	.....	Wages.....	425,149	290,280	252,279	46.5	15.1
Salaried employees.....	67	57	72	.....	.....	Paid for contract work.....	11,731	2,913	3,500	302.7	-16.8
Wage earners (average number).....	425	595	538	-28.6	10.6	Rent and taxes.....	56,004	35,161	32,996	59.3	6.6
Primary horsepower.....	1,153	1,723	995	-33.1	73.2	Cost of materials.....	2,259,142	1,654,006	1,613,581	36.6	2.5
Capital.....	\$2,990,150	\$2,915,244	\$2,280,717	1.8	29.1	Value of products.....	3,315,113	2,395,486	2,230,033	38.4	7.4
						Value added by manufacture.....	1,055,971	741,480	616,452	42.4	20.3

<sup>1</sup> A minus sign (-) denotes decrease; percentages are not shown where base is less than 100.

<sup>2</sup> Value of products less cost of materials.

TABLE 47.—DETAILED STATEMENT, BY STATES: 1919.

STATE.	Number of establishments.	PERSONS ENGAGED IN THE INDUSTRY.									WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.					EXPENSES.			
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks, etc.		Wage earners.				Total.	16 and over.		Under 16.		Capital.	Salaries and wages.		
					Male.	Female.	Average number.	Number, 15th day of—		Male.		Female.	Male.	Female.	Officials.		Clerks, etc.		
								Maximum month.	Minimum month.										
United States.....	18	511	19	27	23	17	425	Oct	473	Apr	373	460	236	222	1	1	\$2,009,150	\$99,646	\$44,264
Pennsylvania.....	14	403	14	19	18	13	339	No <sup>1</sup>	300	Ap	202	377	200	175	1	1	2,211,732	78,431	34,576
All other states <sup>2</sup> .....	4	108	5	8	5	4	86	.....	.....	.....	.....	83	36	47	.....	.....	787,418	21,215	9,688

STATE.	EXPENSES—continued.						Value of products.	Value added by manufacture.	POWER.					Electric horsepower generated in establishments reporting.
	Salaries and wages—Con.	For contract work.	Rent and taxes.		For materials.				Primary horsepower.					
			Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.			Total.	Owned.			Rented. <sup>4</sup>	
										Steam engines and turbines.	Internal combustion engines.	Water power. <sup>3</sup>		
United States.....	\$425,140	\$11,731	\$32,683	\$23,321	\$2,217,552	\$41,590	\$3,315,113	\$1,055,971	1,153	620	.....	206	327	.....
Pennsylvania.....	365,047	11,731	31,308	13,473	1,931,653	33,071	2,791,676	826,952	891	620	.....	206	271	.....
All other states <sup>2</sup> .....	59,502	.....	1,375	9,848	285,899	8,519	523,437	299,019	462	.....	.....	.....	56	.....

<sup>1</sup> Same number reported for one or more other months.

<sup>2</sup> All other states embrace: Illinois, 1 establishment; Louisiana, 1; New York, 1; Rhode Island, 1.

<sup>3</sup> Includes water wheels, turbines, and motors (irrespective of ownership of water supply).

<sup>4</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants).

# MATS AND MATTING.

**General character of the industry.**—This industry includes establishments engaged in the manufacture of doormats and floor mattings, art squares, rugs and carpets. The principal materials used are wire grass, reeds, and coir yarn (coir being the fiber prepared from the outer husk of the coconut).

**Comparative summary and detailed statement.**—Statistics are presented in Table 48 for the industry from 1899 to 1919, inclusive. In 1919 over one-half of the total value of products was reported by five establishments located in the state of Wisconsin, as shown in Table 49.

TABLE 48.—COMPARATIVE SUMMARY: 1919, 1914, 1909, 1904, AND 1899.

	1919	1914	1909	1904	1899	PER CENT OF INCREASE. <sup>1</sup>			
						1914-1919	1909-1914	1904-1909	1899-1904
Number of establishments.....	12	12	12	12	9	.....	.....	.....	.....
Persons engaged.....	1,173	977	1,040	696	1,248	20.1	-6.1	49.4	-44.2
Proprietors and firm members.....	7	10	18	13	9	.....	.....	.....	.....
Salaried employees.....	93	98	85	58	42	.....	.....	.....	.....
Wage earners (average number).....	1,078	869	937	625	1,197	23.5	-7.3	49.9	-47.8
Primary horsepower.....	1,670	1,643	1,433	1,524	1,733	1.6	14.7	-6.0	-12.1
Capital.....	\$7,190,675	\$5,055,114	\$4,051,467	\$338,607	\$994,155	42.2	24.8	383.1	-15.6
Salaries and wages.....	1,040,251	552,070	479,953	316,139	268,342	88.4	15.0	51.8	17.8
Salaries.....	220,644	96,823	94,519	67,035	31,060	137.2	2.4	41.0	115.8
Wages.....	810,607	455,247	385,434	249,104	237,282	78.1	18.1	54.7	5.0
Paid for contract work.....	3,303	21,230	50,127	34,241	100	-84.4	-57.6	46.4	.....
Rent and taxes.....	225,977	43,465	18,172	\$11,989	\$8,100	419.0	139.2	.....	.....
Cost of materials.....	2,102,580	1,170,214	1,066,666	574,168	516,137	79.7	9.7	85.8	11.2
Value of products.....	4,800,855	2,235,867	2,431,615	1,242,996	1,105,330	117.4	-8.1	95.6	6.7
Value added by manufacture <sup>2</sup> .....	2,758,275	1,065,653	1,365,049	668,828	649,193	158.8	-21.9	104.1	3.0

<sup>1</sup> A minus sign (—) denotes decrease; percentages are not shown where base is less than 100.

<sup>2</sup> Exclusive of internal revenue.

<sup>3</sup> Value of products less cost of materials.

TABLE 49.—DETAILED STATEMENT, BY STATES: 1919.

TABLE NO. 1.

STATE.	Number of establishments.	PERSONS ENGAGED IN THE INDUSTRY.							WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.				EXPENSES.				
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks, etc.		Wage earners.		Total.	16 and over.		Under 16.			Salaries and wages.		
					Male.	Female.	Average number.	Number, 15th day of—		Male.	Female.	Male.	Female.				
								Maximum month.						Minimum month.			
United States.....	12	1,173	7	40	37	16	1,073	De 1,292	Jy 893	1,291	890	334	3	14	\$7,190,675	\$147,465	\$82,179
Wisconsin.....	5	723	.....	30	30	15	648	De 778	Jy 527	778	498	296	2	12	2,804,238	123,367	70,726
All other states <sup>1</sup> .....	7	450	7	10	7	1	425	.....	.....	513	392	118	1	2	4,386,437	24,098	11,453

STATE.	EXPENSES—continued.						Value of products.	Value added by manufacture.	POWER.					Electric horsepower generated in establishments reporting.	
	Salaries and wages—Con.	For contract work.	Rent and taxes.		For materials.				Primary horsepower.						
			Wage earners.	Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.			Fuel and rent of power.	Total.	Owned.				Rented. <sup>3</sup>
											Steam engines and turbines.	Internal-combustion engines.	Water power. <sup>2</sup>		
United States.....	\$810,607	\$3,303	\$5,940	\$220,037	\$2,051,382	\$51,198	\$4,860,855	\$2,758,275	1,670	1,255	70	.....	345	355	
Wisconsin.....	446,913	.....	1,500	176,821	1,231,847	23,738	2,821,541	1,565,956	606	275	70	.....	331	218	
All other states <sup>1</sup> .....	363,694	3,303	4,440	43,216	819,535	27,460	2,039,314	1,192,319	1,064	980	70	.....	14	137	

<sup>1</sup> All other states embrace: Michigan, 2 establishments; Minnesota, 1; New York, 2; Pennsylvania, 2.

<sup>2</sup> Includes water wheels and turbines (irrespective of ownership of water supply), and water motors (operated by water from city mains).

<sup>3</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants).

# OILCLOTH AND LINOLEUM.

By ARTHUR J. LECK.

## GENERAL STATISTICS.

**General character of the industry.**—Most oilcloth and linoleum are built on a textile foundation or backing, such as unbleached cotton sheeting, drill, duck, burlap, or felt. These foundation materials are not made within this industry but are purchased, so that the process of manufacture becomes one of mixing and applying the ingredients, much of which is done by the use of special machinery.

**Comparative summary.**—The general developments in the oilcloth and linoleum industry, during the 20 years since 1899, are summarized in Table 1. The two main divisions of the industry—"oilcloth and linoleum, floor," and "oilcloth, enameled"—are here presented both combined and separately.

**Persons engaged in the industry.**—Table 2 shows for 1919, 1914, and 1909 the number of persons engaged in the industry distributed by class and sex, the wage earners being grouped according to age—"16 years of age and over," and "Under 16 years of age."

**Wage earners, by months.**—Table 3 shows the fluctuation by months in the number of wage earners employed in the industry on the 15th of each month during the years 1919 and 1914 for the United States, and for 1919 by states.

**Prevailing hours of labor.**—The tendency of this industry toward fewer working hours per week is evidenced by the statistics presented in Table 4. The

different schedules of time prevailing in the various states are also brought out by this table.

**Size of establishments, by average number of wage earners.**—The size of establishments for the combined industries, as measured by the average number of wage earners, is shown in Table 5 for the United States in 1919 and 1914, and by states in 1919.

**Size of establishments, by value of products.**—The decrease in the number of establishments having a small value of output and the increase in number having a large value is evidenced by the figures presented in Table 6. At the census of 1909 establishments ranging from "\$100,000 to \$1,000,000" in value of products formed one group, while in 1914 and 1919 a division of this group was made in order to permit a more detailed analysis of the subject.

**Character of ownership.**—It is clearly shown in Table 7 that in 1919, 1914, and 1909 the corporate form of ownership predominated in the oilcloth and linoleum industry.

**Number and horsepower of types of prime movers.**—The various types of power used in 1919, 1914, and 1909 are shown in Table 8 for the industry as a whole and separately for the two branches, "oilcloth and linoleum, floor," and "oilcloth, enameled."

**Fuel consumed.**—Table 9 shows an increase from 1914 to 1919 in all kinds of fuel consumed with the exception of anthracite coal and manufactured gas.

TABLE 1.—COMPARATIVE SUMMARY: 1919, 1914, 1909, 1904, AND 1899.

	1910	1914	1909	1904	1899	PER CENT OF INCREASE. <sup>1</sup>			
						1914-1919	1909-1914	1904-1909	1899-1904
OILCLOTH AND LINOLEUM.									
Number of establishments.....	32	31	31	27	27				
Persons engaged.....	7,573	6,234	5,557	4,112	3,409	21.5	12.2	35.1	20.6
Proprietors and firm members.....	7	7	11	12	26				
Salaries and wages.....	1,022	576	345	217	153	77.4	67.0	59.0	41.8
Wage earners (average number).....	6,544	5,651	5,201	3,883	3,230	15.8	8.7	33.9	20.2
Primary horsepower.....	28,010	22,272	16,125	10,112	7,561	25.8	38.1	59.5	33.7
Capital.....	\$60,586,045	\$23,041,178	\$10,634,138	\$13,803,232	\$5,879,102	116.1	42.8	42.2	55.5
Salaries and wages.....	9,902,300	4,149,632	3,474,628	2,304,987	1,922,636	138.6	19.4	50.7	19.9
Salaries.....	2,183,334	936,317	649,083	361,230	294,523	133.2	44.3	79.7	22.6
Wages.....	7,718,966	3,213,315	2,825,545	1,943,757	1,628,113	140.2	13.7	45.4	19.4
Paid for contract work.....	15,798		27,645	4,023				587.2	
Rent and taxes.....	2,361,313	114,805	74,449	249,369	238,004	1,956.8	54.2	50.8	29.9
Cost of materials.....	41,509,426	17,775,863	15,550,101	10,050,009	7,549,672	133.5	14.3	54.7	33.1
Value of products.....	68,110,031	25,598,361	23,339,022	14,792,246	11,402,620	166.1	9.7	57.8	29.7
Value added by manufacture.....	26,000,655	7,822,498	7,788,921	4,742,237	3,852,948	240.1	0.4	64.2	23.1

<sup>1</sup>A minus sign (—) denotes decrease; percentages are omitted where base is less than 100. <sup>2</sup>Exclusive of internal revenue. <sup>3</sup>Value of products less cost of materials.

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TABLE 1.—COMPARATIVE SUMMARY: 1919, 1914, 1909, 1904, AND 1899—Continued.

	1919	1914	1909	1904	1899	PER CENT OF INCREASE. <sup>1</sup>			
						1914-1919	1909-1914	1904-1909	1899-1904
OILCLOTH AND LINOLEUM, FLOOR.									
Number of establishments.....	21	18	19	16	18				
Persons engaged.....	6,254	4,798	4,468	3,548	2,844	30.3	7.4	25.9	24.8
Proprietors and firm members.....	3	3	6	10	21				
Salaried employees.....	837	367	237	183	105	128.1	54.8	29.5	74.3
Wage earners (average number).....	5,414	4,428	4,225	3,355	2,718	22.3	4.8	25.9	23.4
Primary horsepower.....	23,509	18,782	14,158	8,703	6,421	25.2	32.7	62.7	35.5
Capital.....	\$49,803,688	\$20,292,210	\$14,721,702	\$10,108,107	\$7,176,198	145.4	37.8	45.6	40.0
Salaries and wages.....	8,297,546	3,204,608	2,750,367	2,020,089	1,521,174	158.9	16.5	36.2	32.8
Salaries.....	1,779,457	600,240	440,963	300,151	193,939	196.5	36.1	46.9	54.8
Wages.....	6,518,089	2,604,368	2,309,404	1,719,938	1,327,235	150.3	12.8	34.3	29.6
Paid for contract work.....	8,298		27,645						
Rent and taxes.....	2,124,077	79,801	53,517	23,708	23,078	2,501.7	49.1	58.8	5.4
Cost of materials.....	30,368,703	11,251,876	10,146,310	6,770,263	4,858,260	169.0	10.9	49.7	39.7
Value of products.....	52,673,209	17,602,336	15,813,331	10,388,237	7,807,105	199.2	11.3	52.2	33.1
Value added by manufacture <sup>2</sup> .....	22,304,503	6,350,460	5,668,015	3,608,974	2,953,845	251.2	12.0	57.1	22.2
OILCLOTH, ENAMELED.									
Number of establishments.....	11	13	12	11	9				
Persons engaged.....	1,319	1,436	1,089	564	565	-8.1	31.9	93.1	-0.2
Proprietors and firm members.....	4	4	5	2	5				
Salaried employees.....	185	209	108	34	48	-11.5	93.5	217.6	-29.2
Wage earners (average number).....	1,130	1,223	976	528	512	-7.6	25.3	84.0	3.1
Primary horsepower.....	4,501	3,490	1,907	1,409	1,140	20.0	77.4	39.6	23.6
Capital.....	\$10,782,957	\$7,748,908	\$4,912,430	\$3,095,125	\$1,702,904	39.2	57.7	32.9	117.0
Salaries and wages.....	1,004,754	945,024	724,261	284,898	401,462	69.8	30.5	154.2	-29.0
Salaries.....	403,877	336,077	208,120	61,079	100,584	20.2	61.5	240.7	-39.3
Wages.....	1,200,877	608,947	516,141	223,819	300,878	97.2	18.0	130.6	-25.6
Paid for contract work.....	7,500			4,023					
Rent and taxes.....	237,236	35,004	20,932	15,661	2,026	577.7	67.2	33.7	159.9
Cost of materials.....	11,140,723	6,523,987	5,404,785	3,270,740	2,690,412	70.8	20.7	65.2	21.3
Value of products.....	15,436,875	7,996,025	7,525,691	4,404,009	3,896,515	93.1	6.2	70.9	22.5
Value added by manufacture <sup>2</sup> .....	4,296,152	1,472,038	2,120,906	1,133,263	899,103	191.9	-30.0	87.2	20.0

<sup>1</sup> A minus sign (—) denotes decrease; percentages are omitted where base is less than 100. <sup>2</sup> Exclusive of internal revenue. <sup>3</sup> Value of products less cost of materials.

TABLE 2.—PERSONS ENGAGED IN THE INDUSTRY: 1919, 1914, AND 1909.

CLASS.	Cen- sus year.	Total.	Male.	Fe- male.	PER CENT OF TOTAL.		CLASS.	Cen- sus year.	Total.	Male.	Fe- male.	PER CENT OF TOTAL.	
					Male.	Fe- male.						Male.	Fe- male.
OILCLOTH AND LINOLEUM.....	1919	7,573	6,915	658	91.3	8.7	Clerks and other subordinate salaried employees.	1919	640	415	225	64.8	35.2
	1914	6,234	5,946	288	95.4	4.6		1914	285	212	73	74.4	25.6
	1909	5,557	5,344	213	95.2	3.8		1909	161	135	26	83.9	16.1
Proprietors and officials.....	1919	261	260	1	99.6	0.4	Wage earners (average number).....	1919	5,414	5,123	291	94.6	5.4
	1914	132	132		100.0			1914	4,428	4,348	80	98.2	1.8
	1909	111	110	1	99.1	0.9		1909	4,225	4,115	110	97.4	2.6
Proprietors and firm members.....	1919	7	7		100.0		16 years of age and over.....	1919	5,391	5,102	289	94.6	5.4
	1914	7	7		100.0			1914	4,403	4,323	80	98.2	1.8
	1909	11	10	1	90.9	9.1		1909	4,103	4,083	110	97.4	2.6
Salaried officers of corporations.....	1919	66	66		100.0		Under 16 years of age.....	1919	23	21	2	91.3	8.7
	1914	52	52		100.0			1914	25	25		100.0	
	1909	48	48		100.0			1909	32	32		100.0	
Superintendents and managers.....	1919	188	187	1	99.5	0.5	OILCLOTH, ENAMELED.....	1919	1,319	1,177	142	89.2	10.8
	1914	73	73		100.0			1914	1,436	1,301	135	90.6	9.4
	1909	52	52		100.0			1909	1,089	1,013	76	93.0	7.0
Clerks and other subordinate salaried employees.	1919	768	508	260	66.1	33.9	Proprietors and officials.....	1919	61	60	1	98.4	1.6
	1914	451	335	116	74.3	25.7		1914	47	47		100.0	
	1909	245	191	54	78.0	22.0		1909	29	29		100.0	
Wage earners (average number).....	1919	6,544	6,147	397	93.9	6.1	Proprietors and firm members.....	1919	4	4		100.0	
	1914	5,651	5,479	172	97.0	3.0		1914	4	4		100.0	
	1909	5,201	5,043	158	97.0	3.0		1909	5	5		100.0	
16 years of age and over.....	1919	6,508	6,121	387	94.1	5.9	Salaried officers of corporations.....	1919	15	15		100.0	
	1914	5,600	5,438	162	97.1	2.9		1914	10	10		100.0	
	1909	5,154	4,986	168	96.9	3.1		1909	10	10		100.0	
Under 16 years of age.....	1919	36	26	10	72.2	27.8	Superintendents and managers.....	1919	42	41	1	97.6	2.4
	1914	51	41	10	80.4	19.6		1914	33	33		100.0	
	1909	47	47		100.0			1909	14	14		100.0	
OILCLOTH AND LINOLEUM, FLOOR.							Clerks and other subordinate salaried employees.	1919	128	93	35	72.7	27.3
	1914	4,798	4,045	153	95.8	4.2		1914	166	123	43	74.1	25.9
	1909	4,468	4,331	137	96.9	3.1		1909	84	56	28	66.7	33.3
Proprietors and officials.....	1919	200	200		100.0		Wage earners (average number).....	1919	1,130	1,024	106	90.6	9.4
	1914	85	85		100.0			1914	1,223	1,131	92	92.5	7.5
	1909	82	81	1	98.8	1.2		1909	976	928	48	95.1	4.9
Proprietors and firm members.....	1919	3	3		100.0		16 years of age and over.....	1919	1,117	1,019	98	91.3	8.7
	1914	3	3		100.0			1914	1,197	1,115	82	93.1	6.9
	1909	6	5	1	83.3	16.7		1909	981	913	68	93.0	7.0
Salaried officers of corporations.....	1919	51	51		100.0		Under 16 years of age.....	1919	13	5	8	38.5	61.5
	1914	42	42		100.0			1914	26	16	10	61.5	38.5
	1909	38	38		100.0			1909	15	15		100.0	
Superintendents and managers.....	1919	146	146		100.0								
	1914	40	40		100.0								
	1909	38	38		100.0								

## MANUFACTURERS.

TABLE 3.—WAGE EARNERS, BY MONTHS, FOR STATES: 1919.

[The month of maximum employment is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

INDUSTRY AND STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
OILCLOTH AND LINOLEUM.														
United States:														
1919.....	6,544	5,132	4,945	4,950	5,537	6,237	6,813	7,022	7,279	7,438	7,629	7,684	7,862	62.9
Males.....	6,147	4,838	4,674	4,674	5,240	5,872	6,395	6,558	6,818	6,963	7,159	7,202	7,371	63.4
Females.....	397	294	271	276	297	365	418	464	461	475	470	482	491	55.2
1914.....	5,651	5,870	5,859	5,859	5,774	5,727	5,736	5,423	5,449	5,525	5,619	5,446	5,525	92.4
1909.....	5,201	5,083	5,110	5,100	5,067	5,133	5,158	5,169	5,221	5,282	5,351	5,321	5,435	93.0
Massachusetts.....	342	260	252	263	286	344	345	370	392	381	411	401	399	61.3
New Jersey.....	2,393	1,763	1,774	1,904	1,998	2,205	2,468	2,585	2,642	2,739	2,809	2,851	2,978	59.2
Pennsylvania.....	2,549	2,048	1,891	1,767	2,183	2,535	2,705	2,728	2,837	2,918	2,950	2,996	3,030	58.3
OILCLOTH AND LINOLEUM, FLOOR.														
United States:														
1919.....	5,414	4,260	4,065	4,030	4,518	5,117	5,655	5,825	6,061	6,189	6,328	6,381	6,539	61.6
Males.....	5,123	4,048	3,876	3,838	4,321	4,857	5,337	5,481	5,715	5,829	5,979	6,022	6,173	62.2
Females.....	291	212	189	192	197	260	318	344	346	360	349	359	366	51.6
1914.....	4,428	4,572	4,556	4,504	4,499	4,503	4,528	4,267	4,263	4,359	4,431	4,292	4,332	93.2
1909.....	4,225	4,101	4,141	4,113	4,092	4,200	4,209	4,211	4,266	4,307	4,354	4,297	4,414	92.7
New Jersey.....	2,136	1,544	1,544	1,608	1,746	1,956	2,218	2,338	2,397	2,464	2,539	2,558	2,660	58.0
Pennsylvania.....	2,549	2,048	1,891	1,767	2,183	2,535	2,705	2,728	2,837	2,918	2,950	2,996	3,030	58.3
OILCLOTH, ENAMELED.														
United States:														
1919.....	1,130	872	880	920	1,019	1,120	1,158	1,197	1,218	1,249	1,301	1,303	1,323	65.9
Males.....	1,024	790	798	836	919	1,015	1,058	1,077	1,103	1,134	1,180	1,180	1,198	65.9
Females.....	106	82	82	84	100	105	100	120	115	115	121	123	125	65.6
1914.....	1,223	1,298	1,303	1,295	1,275	1,224	1,208	1,166	1,186	1,166	1,188	1,184	1,193	88.7
1909.....	976	982	969	987	965	933	949	958	955	975	997	1,024	1,021	91.1
Massachusetts.....	342	260	252	263	286	344	345	370	392	381	411	401	399	61.3
New Jersey.....	257	219	230	236	252	249	250	247	245	275	270	293	318	68.9

TABLE 4.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR STATES: 1919 AND 1914.

STATE.	Census year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—						
			44 and under.	Between 44 and 48.	48. <sup>1</sup>	Between 48 and 54.	54.	Between 54 and 60.	60.
United States.....	1919	6,544	27	7	225	1,877	1,753	2,286	369
	1914	5,651	( <sup>2</sup> )	( <sup>2</sup> )	6	524	767	3,012	1,342
	1909	5,201	( <sup>2</sup> )	( <sup>2</sup> )	14	16	370	<b>2,074</b>	2,727
Massachusetts.....	1919	342			104	154		84	
New Jersey.....	1919	2,393	27	7	121	1,059	502	677	
Pennsylvania.....	1919	2,549				555	469	1,525	

<sup>1</sup> Includes 48 and under for 1914 and 1909.<sup>2</sup> Corresponding figures not available.

TABLE 5.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR STATES: 1919.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—															
	Establishments.	Wage earners (average number).	1 to 5 wage earners, inclusive.		6 to 20 wage earners, inclusive.		21 to 50 wage earners, inclusive.		51 to 100 wage earners, inclusive.		101 to 250 wage earners, inclusive.		251 to 500 wage earners, inclusive.		501 to 1,000 wage earners, inclusive.		Over 1,000 wage earners.	
			Establish- ments.	Wage earners.	Establish- ments.	Wage earners.	Establish- ments.	Wage earners.	Establish- ments.	Wage earners.	Establish- ments.	Wage earners.	Establish- ments.	Wage earners.	Establish- ments.	Wage earners.	Establish- ments.	Wage earners.
United States:																		
1919.....	32	6,544	.....	.....	4	53	5	162	5	422	10	1,354	4	1,580	3	1,969	1	1,004
1914.....	31	5,651	1	4	6	69	5	141	7	520	4	581	4	1,501	4	2,855	.....	.....
Massachusetts.....	4	342	.....	.....	.....	.....	1	22	1	84	2	236	.....	.....	.....	.....	.....	.....
New Jersey.....	14	2,393	.....	.....	1	7	3	105	1	74	7	970	1	324	1	913	.....	.....
Pennsylvania.....	5	2,549	.....	.....	1	20	.....	.....	.....	.....	.....	.....	1	469	2	1,056	1	1,004



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TABLE 6.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919, 1914, AND 1909.

VALUE OF PRODUCT.	NUMBER OF ESTABLISHMENTS.			AVERAGE NUMBER OF WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
	1919	1914	1909	1919	1914	1909	1919	1914	1909	1919	1914	1909
All classes.....	32	31	31	6,544	5,651	5,201	\$68,110,081	\$25,598,361	\$23,339,022	\$26,600,655	\$7,822,498	\$7,788,921
Less than \$100,000.....	8	7	4	178	92	49	2,578,094	274,700	255,940	765,590	83,446	( <sup>1</sup> )
\$100,000 to \$500,000.....	4	8	19	389	983	1,368	2,778,863	2,111,651	7,415,329	887,797	1,924,286	( <sup>1</sup> )
\$500,000 to \$1,000,000.....	20	7	8	5,977	4,576	3,784	62,765,124	4,818,870	15,067,763	24,947,268	5,814,766	( <sup>1</sup> )
\$1,000,000 and over.....		9						18,393,140				
PER CENT DISTRIBUTION.												
All classes.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.....
Less than \$100,000.....	25.0	22.6	12.9	2.7	1.6	0.9	3.8	1.1	1.1	2.9	1.1	.....
\$100,000 to \$500,000.....	12.5	25.8	61.3	6.0	17.4	26.3	4.1	8.2	31.8	3.3	24.0	.....
\$500,000 to \$1,000,000.....	62.5	22.6	25.8	91.3	81.0	72.8	92.1	18.8	67.1	93.8	74.3	.....
\$1,000,000 and over.....		29.0						71.9				.....

<sup>1</sup> Figures not available.

TABLE 7.—CHARACTER OF OWNERSHIP: 1919.

CHARACTER OF OWNERSHIP.	Cen- sus year.	Num- ber of estab- lish- ments	WAGE EARNERS.		VALUE OF PRODUCTS.		CHARACTER OF OWNERSHIP.	Cen- sus year.	Num- ber of estab- lish- ments	WAGE EARNERS.		VALUE OF PRODUCTS.	
			Aver- age num- ber.	Per cent of total.	Amount.	Per cent of total.				Aver- age num- ber.	Per cent of total.	Amount.	Per cent of total.
All classes.....	1919	32	6,544	100.0	\$68,110,081	100.0	Corporation.....	1919	28	6,340	96.9	\$65,017,438	95.5
	1914	31	5,651	100.0	25,598,361	100.0		1914	27	5,491	97.2	24,487,014	95.7
	1909	31	5,201	100.0	23,339,022	100.0		1909	26	4,955	95.3	22,432,978	96.1
Individual.....	1919	4	1,204	3.1	1,309,643	4.5		1919	4	1,204	3.1		
	1914	4	1,160	2.8	1,111,347	4.3		1914	4	1,160	2.8		
	1909	5	1,246	4.7	1,906,044	3.9		1909	5	1,246	4.7		

<sup>1</sup> Includes 2 establishments in 1919 and 1914, and 3 in 1909 operated under other forms of ownership, to avoid disclosure of individual operations.

## MANUFACTURES.

TABLE 8.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919, 1914, AND 1909.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.					
	1919	1914	1909	Amount.			Per cent distribution.		
				1919	1914	1909	1919	1914	1909
OILCLOTH AND LINOLEUM.									
Primary power, total.....	1,832	599	223	28,010	22,272	16,125	100.0	100.0	100.0
Owned.....	121	151	175	15,273	15,966	15,048	54.5	71.7	93.3
Steam.....	120	148	174	15,271	15,486	15,046	54.5	69.5	93.3
Engines.....	115	( <sup>2</sup> )	( <sup>2</sup> )	13,530	( <sup>2</sup> )	( <sup>2</sup> )	48.3	.....	.....
Turbines.....	5	( <sup>2</sup> )	( <sup>2</sup> )	1,741	( <sup>2</sup> )	( <sup>2</sup> )	6.2	.....	.....
Internal-combustion engines.....	1	3	1	2	480	2	( <sup>3</sup> )	2.2	( <sup>3</sup> )
Rented.....	1,211	448	48	12,737	6,306	1,077	45.5	28.3	6.7
Electric.....	1,211	448	48	12,487	6,300	1,002	44.6	28.3	6.2
Other.....	.....	.....	.....	250	.....	75	0.9	.....	0.5
Electric.....	2,168	1,022	336	21,220	14,965	4,540	100.0	100.0	100.0
Rented.....	1,211	448	48	12,487	6,306	1,002	58.8	42.1	22.1
Generated by establishments reporting.....	957	574	288	8,733	8,659	3,538	41.2	57.9	77.9
OILCLOTH AND LINOLEUM, FLOOR.									
Primary power, total.....	886	438	175	23,509	18,782	14,158	100.0	100.0	100.0
Owned.....	113	124	142	14,323	13,521	13,333	60.9	72.0	94.2
Steam.....	112	124	141	14,321	13,521	13,331	60.9	72.0	94.2
Engines.....	108	( <sup>2</sup> )	( <sup>2</sup> )	12,055	( <sup>2</sup> )	( <sup>2</sup> )	53.8	.....	.....
Turbines.....	4	( <sup>2</sup> )	( <sup>2</sup> )	1,666	( <sup>2</sup> )	( <sup>2</sup> )	7.1	.....	.....
Internal-combustion engines.....	1	.....	1	2	.....	2	( <sup>3</sup> )	.....	( <sup>3</sup> )
Rented.....	773	314	33	9,186	5,261	825	39.1	28.0	5.8
Electric.....	773	314	33	9,186	5,261	825	39.1	28.0	5.8
Electric.....	1,670	707	211	17,719	12,272	3,541	100.0	100.0	100.0
Rented.....	773	314	33	9,186	5,261	825	51.8	42.9	23.3
Generated by establishments reporting.....	897	393	178	8,533	7,011	2,716	48.2	57.1	76.7
OILCLOTH, ENAMELED.									
Primary power, total.....	446	161	48	4,501	3,490	1,967	100.0	100.0	100.0
Owned.....	8	27	33	950	2,445	1,715	21.1	70.1	87.2
Steam.....	8	24	33	950	1,905	1,715	21.1	56.3	87.2
Engines.....	7	( <sup>2</sup> )	( <sup>2</sup> )	875	( <sup>2</sup> )	( <sup>2</sup> )	19.4	.....	.....
Turbines.....	1	( <sup>2</sup> )	( <sup>2</sup> )	75	( <sup>2</sup> )	( <sup>2</sup> )	1.7	.....	.....
Internal-combustion engines.....	.....	3	.....	.....	480	.....	.....	13.8	.....
Rented.....	438	134	15	3,551	1,045	252	78.9	29.9	12.8
Electric.....	438	134	15	3,301	1,045	177	73.3	29.9	9.0
Other.....	.....	.....	.....	250	.....	75	5.6	.....	3.8
Electric.....	498	315	125	3,501	2,693	999	100.0	100.0	100.0
Rented.....	438	134	15	3,301	1,045	177	94.3	38.8	17.7
Generated by establishments reporting.....	60	181	110	200	1,648	822	5.7	61.2	82.3

<sup>1</sup> Figures for horsepower include for 1909 the amount reported under the head of "Other" owned power.

<sup>2</sup> Not reported separately.

<sup>3</sup> Less than one-tenth of 1 per cent.

TABLE 9.—FUEL CONSUMED, BY STATES: 1919.

STATE.		COAL.		Coke (tons, 2,000 pounds).	Fuel oils (barrels).	Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).
		Anthracite (tons, 2,240 pounds).	Bituminous (tons, 2,000 pounds).				
United States.....	1919	39,483	198,187	2,773	16,115	140	.....
	1914	43,673	176,825	625	828	( <sup>1</sup> )	1,215
Massachusetts.....		.....	6,720	.....	.....	.....	.....
New Jersey.....		20,663	77,543	1,263	.....	.....	.....
Pennsylvania.....		.....	86,306	1,458	7,440	140	.....
All other states.....		18,820	27,618	52	8,675	.....	.....

<sup>1</sup> Included with fuel oils in 1914.

## SPECIAL STATISTICS.

The various kinds of products manufactured within the oilcloth and linoleum industry are accounted for in Table 10. Comparative quantities and values are given as far as possible for each product in 1919, 1914, and 1909, also the corresponding per cent of increase or decrease during the five-year period 1914-1919, and the ten-year period 1909-1919.

In 1919 there were 14 establishments in New Jersey, 5 in Pennsylvania, 4 in Massachusetts, 3 in Ohio, 2 each in Maine and New York, and 1 each in Illinois and Indiana.

The artificial leather shown in Table 10 was a subsidiary product of establishments engaged primarily in the manufacture of oilcloth and linoleum. In addition, 17 establishments in 1919 included in the classification "Upholstering materials, not elsewhere specified" reported the production of artificial leather valued at \$26,281,966, compared with \$6,097,293 reported by 10 establishments in 1914.

TABLE 10.—DETAILED STATISTICS OF QUANTITY AND VALUE: 1919, 1914, AND 1909.

PRODUCT.	1919	1914	1909	PER CENT OF INCREASE. <sup>1</sup>		PRODUCT.	1919	1914	1909	PER CENT OF INCREASE. <sup>1</sup>	
				1914-1919	1909-1919					1914-1919	1909-1919
Total value.....	\$68,110,081	\$25,598,361	\$23,339,022	166.1	191.8	Floor covering (made on felt back):					
Oilcloth (made on cotton back):						Square yards.....	30,369,522	( <sup>2</sup> )	( <sup>2</sup> )		
Enameled—						Value.....	\$13,009,276	( <sup>2</sup> )	( <sup>2</sup> )		
Square yards.....	8,460,738	18,357,097	17,338,440	-53.9	-51.2	Artificial leather:					
Value.....	\$3,421,188	\$2,495,255	\$2,265,146	37.1	51.0	Pyroxylin coated textiles—					
Table, wall, shelf, and stair—						Square yards.....	3,332,085	( <sup>2</sup> )	( <sup>2</sup> )		
Square yards.....	39,132,641	59,358,672	61,168,777	-34.1	-36.0	Value.....	\$3,022,558	( <sup>2</sup> )	( <sup>2</sup> )		
Linoleum (made on jute back):	\$12,529,910	\$6,025,348	\$5,639,206	108.0	122.2	All other—					
Linoleum, including cork carpet—						Square yards.....	10,800,416	( <sup>2</sup> )	( <sup>2</sup> )		
Square yards.....	22,098,186	33,306,669	26,215,970	-33.7	-15.7	Value.....	\$4,821,190	( <sup>2</sup> )	( <sup>2</sup> )		
Value.....	\$17,120,654	\$10,043,436	\$7,850,437	70.5	118.1	All other products, value.....	\$2,048,914	\$2,308,485	\$4,589,742	-11.2	-55.4
Inlaid linoleum—											
Square yards.....	9,834,332	8,479,202	4,460,275	16.0	120.5						
Value.....	\$10,336,391	\$4,725,837	\$2,994,491	118.7	246.2						

A minus sign (-) denotes decrease.

<sup>2</sup> Not reported separately.

## GENERAL TABLES.

Table 11 gives, for 1919, 1914, and 1909, by states, the number of establishments, average number of wage earners, primary horsepower, wages, cost of materials, and value of products for the industry.

Table 12 presents, for 1919, statistics in detail for the industry as a whole, and for each state that can be shown separately without the possibility of disclosing the operations of individual establishments.

TABLE 11.—COMPARATIVE SUMMARY, BY STATES: 1919, 1914, AND 1909.

STATE.	Cen- sus year.	Num- ber of estab- lish- ments	Wage earners (aver- age num- ber).	Primary horse- power.	Wages.	Cost of mate- rials.	Value of prod- ucts.	STATE.	Cen- sus year.	Num- ber of estab- lish- ments	Wage earners (aver- age num- ber).	Primary horse- power.	Wages.	Cost of mate- rials.	Value of prod- ucts.
					Expressed in thousands.								Expressed in thousands.		
United States.....	1919	32	6,544	28,010	\$7,719	\$41,509	\$68,110	Pennsylvania <sup>2</sup> .....	1919	5	2,549	11,871	\$3,065	\$11,873	\$28,806
	1914	31	5,661	22,272	3,213	17,776	26,598		1914	5	1,803	9,554	1,072	4,647	7,165
	1909	31	5,201	16,125	2,826	15,550	23,339								
Massachusetts <sup>1</sup> .....	1919	4	342	1,361	325	4,341	5,747	All other states.....	1919	9	1,200	5,074	1,386	10,000	8,022
	1914	3	220	375	118	1,211	1,704		1914	16	1,658	4,495	854	5,469	7,040
	1909	3	220	375	118	1,211	1,704		1909	18	2,858	7,931	1,521	7,701	11,492
New Jersey.....	1919	14	2,393	9,704	2,943	15,295	25,535								
	1914	10	2,190	8,223	1,287	7,660	11,384								
	1909	10	2,123	7,819	1,187	6,638	10,143								

<sup>1</sup> Not reported separately in 1914.<sup>2</sup> Not reported separately in 1909.

## MANUFACTURES.

TABLE 12.—DETAILED STATEMENT, BY STATES: 1919.

INDUSTRY AND STATE.	Number of establishments.	PERSONS ENGAGED IN THE INDUSTRY.								WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.						EXPENSES.	
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks, etc.		Wage earners.		Total.	16 and over.		Under 16.		Capital.	Salaries and wages.		
					Male.	Female.	Average number.	Number, 15th day of—		Male.	Female.	Male.	Female.		Officials.	Clerks, etc.	
								Maximum month.									Minimum month.
<b>OILCLOTH AND LINOLEUM.</b>																	
United States.....	32	7,573	7	254	508	200	6,544	De 7,862	Fe 4,074	7,789	7,308	440	29	12	\$60,586,645	\$1,152,348	\$1,030,986
Massachusetts.....	4	375	.....	20	7	6	342	Oc 411	Fe 252	399	331	54	4	10	2,091,690	84,258	30,484
New Jersey.....	14	2,739	5	95	168	78	2,393	De 2,978	Se 1,703	2,978	2,886	69	23	.....	24,119,752	462,180	313,310
Pennsylvania.....	5	3,010	.....	102	220	145	2,549	De 3,030	Mh 1,707	2,954	2,790	160	2	2	21,255,523	423,850	467,375
All other states.....	9	1,443	2	37	113	31	1,260	.....	.....	1,458	1,301	157	.....	.....	12,519,680	182,060	219,811
<b>OILCLOTH AND LINOLEUM, FLOOR.</b>																	
United States.....	21	6,254	3	107	415	225	5,414	De 6,539	Mh 4,030	6,463	6,113	325	23	2	49,803,688	922,871	856,586
New Jersey.....	10	2,419	1	71	143	68	2,136	De 2,660	Ja 1,544	2,660	2,573	66	21	.....	21,287,275	400,951	285,178
Pennsylvania.....	5	3,016	.....	102	220	145	2,549	De 3,030	Mh 1,707	2,954	2,790	160	2	2	21,255,523	423,850	467,375
All other states <sup>2</sup> .....	6	819	2	24	52	12	729	.....	.....	849	760	99	.....	.....	7,260,890	98,070	104,033
<b>OILCLOTH, ENAMELED.</b>																	
United States.....	11	1,319	4	57	93	35	1,130	De 1,323	Ja 872	1,325	1,195	115	6	10	10,782,957	229,477	174,400
Massachusetts.....	4	375	.....	20	7	6	342	Oc 411	Fe 252	399	331	54	4	10	2,091,690	84,258	30,484
New Jersey.....	4	320	4	24	25	10	257	De 318	Ja 219	318	313	3	2	.....	2,832,477	61,220	28,138
All other states <sup>3</sup> .....	3	624	.....	13	61	19	531	.....	.....	609	551	58	.....	.....	5,258,700	88,990	115,778
<b>EXPENSES—continued.</b>																	
INDUSTRY AND STATE.	Salaries and wages—Continued.	Wage earners.	For contract work.	Rent and taxes.		For materials.		Value of products.	Value added by manufacture.	POWER.							
				Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.			Primary horsepower.					Electric horsepower generated in establishments reporting.		
										Owned.	Owned.	Owned.	Rented. <sup>4</sup>				
<b>OILCLOTH AND LINOLEUM.</b>																	
United States.....	\$7,718,966	\$15,708	\$3,321	\$2,352,992	\$39,892,145	\$1,617,281	\$68,110,081	\$26,600,655	28,010	13,530	1,741	2	12,787	8,733			
Massachusetts.....	324,758	7,500	.....	41,121	4,278,999	62,495	5,740,839	1,405,845	1,361	540	.....	.....	821	.....			
New Jersey.....	2,042,921	8,298	.....	1,350,049	14,712,001	582,881	25,534,739	10,239,862	9,704	5,640	1,375	.....	2,689	3,308			
Pennsylvania.....	3,064,992	.....	321	799,659	11,852,980	620,194	28,805,611	10,932,437	11,871	5,180	366	2	6,323	4,820			
All other states.....	1,386,295	.....	8,000	162,163	9,648,165	451,711	8,022,892	4,023,011	5,074	2,170	.....	.....	2,904	605			
<b>OILCLOTH AND LINOLEUM, FLOOR.</b>																	
United States.....	6,518,089	8,298	321	2,123,756	20,020,819	1,347,884	52,673,206	22,804,503	23,509	12,655	1,666	2	9,186	8,533			
New Jersey.....	2,655,789	8,298	.....	1,224,144	12,244,708	539,193	21,088,734	8,904,743	8,844	5,480	1,300	.....	2,004	3,108			
Pennsylvania.....	3,064,992	.....	321	799,659	11,852,980	620,194	28,805,611	10,932,437	11,871	5,180	366	2	6,323	4,820			
All other states <sup>2</sup> .....	797,308	.....	.....	90,953	5,423,011	288,497	2,178,861	2,467,323	2,794	1,995	.....	.....	799	605			
<b>OILCLOTH, ENAMELED.</b>																	
United States.....	1,200,877	7,500	8,000	229,236	10,871,326	269,397	15,436,875	4,296,152	4,501	875	75	.....	3,551	200			
Massachusetts.....	324,758	7,500	.....	41,121	4,278,999	62,495	5,740,839	1,405,845	1,361	540	.....	.....	821	.....			
New Jersey.....	287,132	.....	.....	125,905	2,407,203	43,683	3,846,005	1,335,119	860	160	75	.....	625	200			
All other states <sup>3</sup> .....	588,987	.....	8,000	62,210	4,125,124	163,214	5,844,031	1,555,688	2,280	175	.....	.....	2,105	.....			

<sup>1</sup> Same number reported for one or more other months.<sup>2</sup> All other states embrace: Illinois, 1 establishment; Indiana, 1; Maine, 1; New York, 1; and Ohio, 2.<sup>3</sup> All other states embrace: Maine, 1 establishment; New York, 1; and Ohio, 1.<sup>4</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants).

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## IRON AND STEEL AND THEIR PRODUCTS

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## IRON AND STEEL—THE INDUSTRIAL GROUP.

**Relationship of the industries.**—Five classes of products—(1) pig iron, (2) ferroalloys, (3) steel, and hot-rolled iron and steel, (4) tin plate and terneplate, and (5) wire—are to a large extent closely related. Most of the black-plate mills have tin-dipping departments and produce finished tin and terne plate, and some wire-rod mills turn out finished wire products.

At prior censuses separate reports were received for the tin-plate departments of black-plate rolling mills and the wire-drawing departments of wire-rod mills, but at the present census this segregation was abandoned, and reports for plants involving steel production, hot rolling, and tin dipping or wire drawing, or other fabricating operations for the production of finished products from rolled stock cover all operations of the plant, though some of the products when made in plants that did not produce the rolled stock are the subject of other industry classifications.

The comparability of the general statistics with prior censuses is therefore affected, especially with respect to the tin and terne plate industry and the wire industry, because some departments of rolling mills, formerly included in the classified tin-plate and terneplate or wire industry, because of segregated reports having been made therefor, now are included in the rolling-mill statistics.

The statistics for specific products, however, represent total production, irrespective of the industry classification of the producing plants.

The blast-furnace industry is preserved intact. Separate reports were made for the blast-furnace department of plants making pig iron, steel, and doing hot rolling in one industrial unit. More than 70 per cent of the pig-iron production goes into steel in the same plant. A transfer value was assigned to the pig iron which figures as product and income for the blast furnace and as raw material and expense for the steel department.

The manufacture of ferroalloys has been made a specific industry which carries as subgroups the blast-furnace ferroalloys and the electric-furnace products. At previous censuses the blast-furnace ferroalloys were included in the pig-iron industry. Of the total ferroalloy product, about 30 per cent was consumed in the producing plants. Statistics for the ferroalloy industry are given as a separate section of this report.

Less than 1 per cent of the output of tin and terne plate was manufactured by independent dipping plants not directly connected with black-plate mills.

The wire industry as here represented is not confined to iron and steel wire. It includes all establishments engaged primarily in wire drawing, but steel

wire is the leading product, and nearly two-thirds of the steel and iron wire is drawn in plants that roll the wire rods. The statistics for the wire industry are given in a special section of this report.

**Duplication within the iron and steel industry.**—The duplications arising from the use of the finished product of one establishment as raw material of another within the same group results in the totals being of but little significance. Within the steel-works and rolling-mills industry alone there is considerable duplication. Table 1 shows for 1919, 1914, and 1909 the gross value of products for the industrial group and its component industries, the value of the products consumed by establishments within the group, and the remaining balance, which balance represents production available for outside consumption and export. It also shows the average number of wage earners and the value added by manufacture, together with the per cent distribution of the several totals.

Of the total value of blast-furnace products in 1919, over four-fifths was used by the steel works and rolling mills; and of the aggregate value of products for the industrial group, 31.1 per cent was consumed by establishments within the group in 1919, 32.5 per cent in 1914, and 33.8 per cent in 1909.

**Blast furnaces and steel works and rolling mills.**—On account of interdepartmental duplications, but little significance can be attached to the combined cost of materials and value of products for the separate industries involved, but statistics of labor, power, and certain financial operations can be properly combined. Such statistics are presented in Table 2 for the blast-furnace and steel-work and rolling-mill industries combined, for the censuses 1899 to 1919, inclusive.

Pig-iron production in 1919 was an increase of 32.3 per cent over that of 1914, the latter being 9.3 per cent less than in 1909. The year 1914 was one of great depression in the iron and steel industry. The steel works and rolling mills consumed 72.9 per cent of the pig iron produced in 1899, 73.3 per cent in 1904, 74.4 per cent in 1909, 74.9 per cent in 1914, and 78.3 per cent in 1919.

**Principal states, ranked by value of products.**—Table 3 shows for blast furnaces and steel works and rolling mills combined, by states, ranked according to value of products, the average number of wage earners, value of products, and value added by manufacture, with per cent distribution. Certain states included with "All other states" ranked higher than some of those named in the table.

## MANUFACTURES.

TABLE 1.—IRON AND STEEL—DUPLICATIONS WITHIN THE INDUSTRIAL GROUP: 1919, 1914, AND 1909.

	Aggregate.	Blast furnaces.	Ferroalloys.	Steel works and rolling mills.	Wire mills (not departments of steel-rolling mills).	Tin-plate and terneplate mills (not departments of steel-plate mills).
Gross value of products:						
1919.....	\$3,921,508,874	\$794,466,558	\$38,583,984	\$2,828,902,376	\$162,151,236	\$97,404,720
1914.....	1,386,502,522	317,653,983		918,664,655	81,842,012	68,342,962
1909.....	1,509,807,980	301,429,283		985,722,534	84,486,518	47,969,645
Products consumed by establishments within this industrial group:						
1919.....	1,220,006,958	655,002,125	31,914,054	533,090,779		
1914.....	449,968,647	248,630,958		201,362,680		
1909.....	510,538,170	297,471,122		213,067,057		
Products minus interindustry duplications:						
1919.....	2,701,501,916	139,464,433	6,669,930	2,295,811,597	162,151,236	97,404,720
1914.....	936,508,875	69,023,025		717,301,876	81,841,012	68,342,962
1909.....	999,069,801	93,958,161		772,655,477	84,486,518	47,969,645
Wage earners, average number:						
1919.....	441,955	41,660	2,344	375,088	19,741	3,122
1914.....	300,910	29,356		248,716	17,600	5,238
1909.....	301,941	38,429		240,076	18,084	5,352
Value added by manufacture:						
1919.....	1,415,311,804	173,180,062	10,485,408	1,148,326,618	59,337,645	23,982,071
1914.....	416,765,715	53,073,923		327,838,873	25,416,518	10,436,401
1909.....	429,036,870	70,791,394		328,221,678	23,943,587	6,080,211
Per cent distribution:						
Gross value of products—						
1919.....	100.0	20.3	1.0	72.1	4.1	2.5
1914.....	100.0	22.9		66.3	5.9	4.9
1909.....	100.0	25.9		65.3	5.6	3.2
Products minus interindustry duplications:						
1919.....	100.0	5.2	0.2	85.0	6.0	3.6
1914.....	100.0	7.4		70.6	8.7	7.3
1909.....	100.0	9.4		77.3	8.5	4.8
Wage earners, average number:						
1919.....	100.0	9.4	0.5	84.9	4.5	0.7
1914.....	100.0	9.8		82.7	5.8	1.7
1909.....	100.0	12.7		79.5	6.0	1.8
Value added by manufacture:						
1919.....	100.0	12.2	0.8	81.1	4.2	1.7
1914.....	100.0	12.7		78.7	6.1	2.6
1909.....	100.0	16.5		76.5	5.6	4.4

TABLE 2.—COMPARATIVE SUMMARY—BLAST FURNACES AND STEEL WORKS AND ROLLING MILLS COMBINED: 1919, 1914, 1909, 1904, AND 1899.

	1919	1914	1909	1904	1899	PER CENT OF INCREASE. <sup>1</sup>			
						1914-1919	1909-1914	1904-1909	1899-1904
Number of establishments.....	695	587	654	605	665	18.4	-10.2	8.1	-9.4
Persons engaged in the industry.....	468,817	307,950	309,823	259,201	231,871	52.5	1.2	17.2	11.8
Proprietors and firm members.....	70	67	95	90	170				-47.1
Salaried employees.....	51,993	29,217	25,223	16,561	9,211	78.0	15.8	52.3	79.8
Wage earners (average number).....	416,748	278,072	278,605	242,640	222,490	49.9	-0.2	14.8	9.1
Primary horsepower.....	5,420,349	3,928,826	3,274,400	2,422,577	1,598,073	38.0	20.0	35.2	51.6
Capital.....	\$3,458,934,958	\$1,720,652,188	\$1,492,815,770	\$936,327,339	\$573,391,062	10.10	15.3	54.9	63.3
Salaries and wages.....	\$824,722,293	\$254,553,528	\$220,523,364	\$182,177,898	\$132,559,764	22.40	15.4	36.0	22.8
Salaries.....	\$113,315,468	\$43,680,504	\$32,718,076	\$20,751,392	\$11,737,488	100.0	53.4	57.7	76.8
Wages.....	\$711,406,825	\$210,873,024	\$187,807,288	\$161,426,506	\$120,822,276	237.0	12.3	32.8	17.1
Value added by manufacture <sup>2</sup> .....	\$1,321,506,680	\$380,012,706	\$399,019,072	\$285,641,383	\$281,570,341	247.0	-4.5	39.7	1.4
Pig iron:									
Production, tons (2,240 pounds).....	30,543,167	23,269,731	25,651,798	16,623,625	14,447,791	32.3	-9.3	54.3	15.1
Consumption by steel works and rolling mills, tons.....	23,921,071	17,429,657	19,076,889	12,191,228	10,410,281	37.2	-8.6	56.5	17.1
Finished rolled products and forgings, tons.....	25,512,847	18,482,182	19,276,237	12,759,993	10,393,796	38.0	-4.1	51.1	22.7

<sup>1</sup> A minus sign (—) denotes decrease; percentages are omitted where basis is less than 100.<sup>2</sup> Aggregate value of products less aggregate cost of materials.

TABLE 3.—BLAST FURNACES AND STEEL WORKS AND ROLLING MILLS COMBINED—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
		Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.
United States.....	695	416,748	100.0	.....	\$3,623,369	100.0	.....	\$1,321,507	100.0	.....
Pennsylvania.....	256	186,334	44.7	.....	1,607,492	44.4	1	585,059	44.3	1
Ohio.....	128	82,818	19.9	2	806,604	22.2	2	286,867	21.7	2
Indiana.....	26	23,730	5.7	3	251,807	6.9	3	98,590	7.5	3
Illinois.....	37	22,305	5.4	4	238,107	6.6	4	86,261	6.5	4
New York.....	39	20,111	4.8	5	162,195	4.2	5	57,067	4.3	5
Alabama.....	30	13,335	3.2	7	121,998	3.4	6	27,793	2.1	8
West Virginia.....	24	12,047	2.9	8	81,445	2.5	7	35,143	2.6	7
New Jersey.....	19	14,298	3.4	6	78,241	2.1	8	41,166	3.1	6
Wisconsin.....	15	4,411	1.1	10	36,304	1.0	9	15,566	1.2	9
Kentucky.....	9	2,367	0.6	13	22,784	0.7	11	6,459	0.5	16
Michigan.....	18	2,556	0.6	16	21,878	0.6	12	8,678	0.7	12
California.....	8	3,470	0.8	13	13,192	0.5	14	8,683	0.7	11
Missouri.....	8	3,142	0.8	14	14,980	0.4	15	7,591	0.6	13
Delaware.....	6	1,009	0.2	22	7,115	0.2	18	3,253	0.2	20
All other states.....	72	24,778	5.9	.....	153,224	4.3	.....	53,341	4.0	.....

# BLAST FURNACES.

## GENERAL STATISTICS.

**Distribution of the industry.**—The blast-furnace ferroalloys are included for the present census in the ferroalloy section of this report, and the statistics here presented are confined to the pig-iron industry exclusive of ferroalloys.

The industry at prior censuses embraced all ferro blast-furnace products. Comparisons for 1919 with respect to prior censuses are therefore to a certain extent affected by this change in classification.

**Comparative summary.**—Table 4 summarizes the statistics for the pig-iron industry for each census from 1879 to 1919, showing percentages of increase for each census period.

**Principal states, ranked by value of products.**—Table 5 gives, by states, the average number of wage earners, value of products, and value added by manufacture, ranked according to value of products, with the per cent distribution of the several items.

**Persons engaged in the industry.**—Table 6 presents the comparative statistics for 1919, 1914, and 1909, for persons engaged in the industry, classified as to their occupational status, sex, and whether over or under 16 years of age. The age classification of the average number of wage earners is an estimate obtained by the method described in the "Explanation of terms."

**Wage earners, by months.**—In Table 7 are shown the statistics, by months, for wage earners for 1919, 1914, and 1909, and for 1919 by states. The table affords a view of the seasonal movements of the labor market in the industry and in a way the industrial conditions obtaining therein. Female wage earners are negligible, only a few being incidentally reported.

**Prevailing hours of labor.**—Table 8 illustrates the tendency towards shortening the hours of labor. In 1909, 96.5 per cent of the wage earners were in establishments where the prevailing hours of labor were over 60 per week, and none in establishments of 54 hours or less per week. In 1914 the proportion of those working in establishments where the prevailing hours of labor were over 60 per week fell to 79.1 per cent, and 5.6 per cent were in establishments with 54 hours per week or less; while in 1919, 7 per cent were in establishments with hours of 48 or less per week, and only 67 per cent in the over 60-hour class.

**Size of establishments, by average number of wage earners.**—The industry is one of large units, as shown by Table 9. In 1919 the establishments averaged 214

wage earners as compared with 183 in 1914 and 185 in 1909. In 1919 there were 51 establishments, or 26.1 per cent of the total number, that employed over 250 wage earners, the aggregate number constituting 64 per cent of all wage earners. In 1914, 33 establishments of this class reported 53.4 per cent of all wage earners, and in 1909, 45 establishments reported 55.3 per cent of all wage earners.

**Size of establishments, by value of products.**—The grouping by value of products in Table 10 necessarily reflects the general increase in values, which accounts in the main for changes from lower to higher groups. In 1909 the average value of products per establishment was approximately \$1,900,000, and in 1914, \$1,985,000; but in 1919 it was \$4,074,000. On a quantity production basis the establishments averaged approximately 123,000 tons of pig iron per establishment in 1909; 145,200 tons in 1914; and 155,200 tons in 1919. In 1909, 41.3 per cent of the establishments reported products of \$1,000,000 and over, with 85.8 per cent of the value of all products; and in 1914, 41.3 per cent of the establishments were of the same character, with 85.9 per cent of the value of all products. In 1919 this group carried 66.7 per cent of all establishments, 96.1 per cent of the value of all products, and produced 96.9 per cent of the pig-iron tonnage.

**Character of ownership.**—With a few exceptions the establishments are owned by corporations. Of the 195 establishments constituting the industry in 1919, 187 were corporations, the remaining 8 being equally divided between individuals and "All others," the latter chiefly firms, these reporting but approximately 1 per cent of the products.

**Number and horsepower of types of prime movers.**—Table 11 presents the power equipment statistics for 1919, 1914, and 1909. This table emphasizes the increase in electric power. Owned power increased during the period 1914-1919, 27.7 per cent; purchased electric power 123 per cent.

**Fuel consumed.**—Table 12 presents, by states, the comparative statistics of fuel consumed in the industry in 1919 and 1914 by kinds. The figures include the smelting fuels as well as those used for steam and power purposes. The table includes the statistics for charcoal used in the charcoal-iron furnaces.



## MANUFACTURES.

TABLE 4.—COMPARATIVE SUMMARY: 1919, 1914, 1909, 1904, 1899, 1889, AND 1879.

	1919	1914	1909	1904	1899	1889	1879	PER CENT OF INCREASE. <sup>1</sup>					
								1914-1919	1909-1914	1904-1909	1899-1904	1889-1899	1879-1889
Number of establishments.....	195	160	208	190	223	304	341	21.9	-23.1	9.5	-14.8	-26.6	-10.9
Persons engaged.....	46,956	33,194	43,061	37,335	41,046	( <sup>2</sup> )	( <sup>2</sup> )	41.5	-22.9	15.3	-9.0	.....	.....
Proprietors and firm members.....	41	15	48	20	48	( <sup>2</sup> )	( <sup>2</sup> )	.....	.....	.....	.....	.....	.....
Salaried employees.....	5,255	3,823	4,584	2,231	1,757	( <sup>2</sup> )	( <sup>2</sup> )	37.5	-18.6	105.5	27.0	.....	.....
Wage earners (average number).....	41,660	29,356	38,429	35,078	39,241	33,415	41,695	41.9	-23.6	9.6	-10.6	17.4	( <sup>3</sup> )
Primary horsepower.....	1,581,432	1,222,273	1,173,422	773,278	497,272	248,928	( <sup>2</sup> )	29.4	4.2	51.7	55.5	90.8	.....
Capital.....	\$802,416,541	\$462,281,594	\$487,580,659	\$236,145,529	\$143,169,232	\$129,517,485	\$89,631,362	73.6	-5.2	106.5	65.0	20.4	4.4
Salaries and wages.....	\$87,204,443	\$28,895,203	\$31,131,142	\$21,825,410	\$20,788,520	\$16,228,145	\$12,655,428	302.0	-7.2	42.6	5.0	28.1	( <sup>3</sup> )
Salaries.....	\$13,435,048	\$6,114,577	\$6,524,612	\$2,890,897	\$2,304,120	( <sup>2</sup> )	( <sup>2</sup> )	120.0	-6.3	125.7	25.5	.....	.....
Wages.....	\$73,769,395	\$22,780,626	\$24,606,530	\$18,934,513	\$18,484,400	( <sup>2</sup> )	( <sup>2</sup> )	224.0	-7.4	30.0	2.4	.....	.....
Paid for contract work.....	\$692,293	\$265,108	\$68,808	\$7,871	\$103,291	( <sup>2</sup> )	( <sup>2</sup> )	161.0	285.0	174.0	-92.4	.....	.....
Rent and taxes.....	\$20,936,561	\$2,937,517	\$2,147,148	\$984,636	\$1,010,724	( <sup>2</sup> )	( <sup>2</sup> )	613.0	36.8	.....	-2.6	.....	.....
Cost of materials.....	\$921,286,496	\$264,530,060	\$320,637,889	\$178,941,918	\$131,503,655	\$110,098,615	\$58,619,742	135.0	-17.5	79.2	36.1	19.4	87.8
Value of products.....	\$794,466,558	\$317,653,983	\$391,429,283	\$231,822,707	\$206,756,557	\$145,643,153	\$89,315,569	150.0	-18.8	68.8	12.1	42.0	63.1
Value added by manufacture <sup>5</sup> .....	\$173,180,062	\$53,073,923	\$70,791,394	\$52,880,789	\$75,252,902	\$35,544,538	\$30,695,827	226.0	-25.0	33.9	-29.7	111.7	15.8
Pig-iron production, tons (2,240 pounds).....	30,543,167	23,269,731	25,651,798	16,623,625	14,447,791	8,845,185	3,375,912	31.3	-9.3	54.3	15.1	63.3	162.0

<sup>1</sup> A minus sign (-) denotes decrease; percentages are omitted where base is less than 100.<sup>2</sup> Figures not available.<sup>3</sup> Figures not strictly comparable.<sup>4</sup> Exclusive of internal revenue.<sup>5</sup> Value of products less cost of materials.

TABLE 5.—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	Number of establishments.	WAGE EARNERS.			PRODUCTS.				VALUE ADDED BY MANUFACTURE.		
		Average number.	Per cent distribution.	Rank.	Total value.			Pig iron (tons).	Amount (expressed in thousands).	Per cent distribution.	Rank.
					Amount (expressed in thousands).	Per cent distribution.	Rank.				
United States.....	195	41,660	100.0	.....	\$794,467	100.0	.....	30,543,167	\$173,180	100.0	.....
Pennsylvania.....	58	14,019	35.1	1	311,080	39.6	1	12,014,112	66,120	38.2	1
Ohio.....	42	9,793	23.5	2	179,234	22.4	2	7,073,337	41,547	24.0	2
Illinois.....	5	2,120	5.1	5	64,762	8.1	3	2,528,888	13,236	7.7	3
Alabama.....	21	5,214	12.5	3	57,018	7.1	4	2,111,381	12,147	7.0	5
New York.....	9	2,210	5.3	4	51,802	6.4	6	1,890,994	11,201	6.5	6
Michigan.....	11	1,101	2.7	7	13,634	1.7	7	420,301	3,235	1.9	7
Virginia.....	12	1,081	2.6	8	10,098	1.3	8	291,117	1,828	1.1	9
West Virginia.....	4	417	1.0	14	6,412	0.8	13	251,751	901	0.5	14
Tennessee.....	8	884	2.1	9	6,218	0.8	14	182,033	1,651	0.9	10
Kentucky.....	4	475	1.1	13	4,465	0.6	15	153,708	854	0.5	15
New Jersey.....	3	487	1.2	12	3,858	0.4	16	118,418	1,111	0.6	13
All other states.....	18	3,250	7.8	.....	89,180	10.8	.....	3,497,127	19,259	11.1	.....

TABLE 6.—PERSONS ENGAGED IN THE INDUSTRY: 1919, 1914, AND 1909.

CLASS.	Cen- sus year.	Total.	Male.	Fe- male.	PER CENT OF TOTAL.		CLASS.	Cen- sus year.	Total.	Male.	Fe- male.	PER CENT OF TOTAL.	
					Male.	Fe- male.						Male.	Fe- male.
All classes.....	1919	46,956	46,005	951	98.0	2.0	Clerks and other subordinate salaried employees.....	1919	3,914	3,031	883	77.2	22.8
	1914	33,194	32,813	381	98.9	1.1		1914	3,070	2,698	372	87.9	12.1
	1909	43,061	42,715	346	99.2	0.8		1909	3,513	3,182	331	90.6	9.4
Proprietors and officials.....	1919	1,382	1,368	14	99.0	1.0	Wage earners (average number).....	1919	41,660	41,606	54	99.9	0.1
	1914	768	765	3	99.6	0.4		1914	29,356	29,350	6	100.0	( <sup>1</sup> )
	1909	1,119	1,112	7	99.4	0.6		1909	38,429	38,421	8	100.0	( <sup>1</sup> )
Proprietors and firm members.....	1919	41	29	12	70.7	29.3	16 years of age and over.....	1919	41,656	41,602	54	.....	.....
	1914	15	12	3	80.0	20.0		1914	29,304	29,298	6	100.0	( <sup>1</sup> )
	1909	48	43	5	89.6	10.4		1909	38,361	38,353	8	100.0	( <sup>1</sup> )
Salaried officers of corporations....	1919	222	221	1	99.5	0.5	Under 16 years of age.....	1919	4	4	.....	.....	.....
	1914	193	193	.....	100.0	.....		1914	52	52	.....	100.0	.....
	1909	262	260	2	99.2	0.8		1909	68	68	.....	100.0	.....
Superintendents and managers....	1919	1,119	1,118	1	99.9	0.1							
	1914	560	560	.....	100.0	.....							
	1909	809	809	.....	100.0	.....							

<sup>1</sup> Less than one-tenth of 1 per cent.

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TABLE 7.—WAGE EARNERS, BY MONTHS, FOR STATES: 1919.

[The month of maximum employment is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
United States:														
1919	41,000	51,467	47,415	41,839	40,399	37,039	37,533	40,412	42,394	42,897	<i>33,028</i>	39,022	41,975	65.3
1914	41,000	51,409	47,357	44,779	40,342	37,886	37,481	40,359	42,342	42,845	<i>33,576</i>	38,971	41,925	65.3
1909	38,429	54,58	47,357	44,779	40,342	37,886	37,481	40,359	42,342	42,845	<i>33,576</i>	38,971	41,925	65.3
Alabama	5,214	6,435	5,781	5,553	4,905	4,000	4,215	4,089	5,363	5,580	5,389	5,185	5,014	62.3
Illinois	2,120	2,571	2,382	2,172	2,006	1,806	1,840	2,075	2,276	2,304	<i>1,219</i>	2,478	2,419	47.4
Kentucky	475	697	472	529	323	213	168	552	555	559	556	496	575	24.1
Michigan	1,101	1,173	1,151	1,132	1,105	1,116	1,093	1,123	1,124	1,035	1,056	1,033	1,071	83.1
New Jersey	487	763	690	683	416	408	383	457	454	447	<i>352</i>	393	393	46.1
New York	2,210	2,558	2,273	2,275	2,151	2,301	2,221	2,467	2,345	2,318	1,589	1,966	2,026	62.1
Ohio	9,703	12,137	11,080	10,247	9,534	8,322	9,465	9,035	10,163	10,440	<i>6,105</i>	8,831	10,201	50.3
Pennsylvania	14,619	17,654	16,024	15,084	14,013	13,003	13,134	13,838	14,030	15,005	<i>12,733</i>	13,764	14,982	72.8
Tennessee	884	1,236	1,130	925	830	807	805	759	708	803	854	767	894	61.4
Virginia	1,081	1,748	1,604	1,598	1,309	1,100	887	775	807	831	867	860	861	39.3
West Virginia	417	484	332	318	303	253	252	206	690	708	380	426	672	35.6

TABLE 8.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK: 1919 AND 1914.

STATE.	Cen- sus year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—							STATE.	Cen- sus year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—								
			44 and under.	Be- tween 44 and 48.	48. <sup>1</sup>	Be- tween 48 and 54.	54.	Be- tween 54 and 60.	60.				Over 60.	44 and under.	Be- tween 44 and 48.	48. <sup>1</sup>	Be- tween 48 and 54.	54.	Be- tween 54 and 60.	60.	Over 60.
United States.	1919	41,060	1,471	.....	1,453	.....	30	2,617	8,153	27,936	New York.....	1919	2,210	.....	.....	124	.....	.....	154	1,932	
	1914	29,356	( <sup>2</sup> )	( <sup>2</sup> )	11	80	1,551	13	4,474	23,227		1914	1,832	( <sup>2</sup> )	( <sup>2</sup> )	358	.....	382	.....	1,091	
	1909	38,429	.....	.....	.....	.....	.....	190	1,149	37,090											
Alabama.....	1919	5,214	.....	.....	302	.....	.....	.....	2,445	2,467	Ohio.....	1919	9,793	.....	.....	87	.....	988	1,702	6,956	
	1914	3,547	.....	.....	.....	.....	.....	.....	1,544	2,003		1914	5,780	.....	.....	.....	918	.....	4,868		
Illinois.....	1919	2,120	272	.....	263	.....	.....	.....	.....	1,594	Pennsylvania.....	1919	14,619	1,034	( <sup>2</sup> )	( <sup>2</sup> )	1,273	.....	850	1,961	10,768
	1914	1,450	.....	.....	.....	.....	.....	682	.....	708		1914	11,618	( <sup>2</sup> )	( <sup>2</sup> )	.....	5	.....	.....	10,240	
Kentucky <sup>1</sup> .....	1919	475	.....	.....	.....	.....	30	.....	.....	445	Tennessee.....	1919	884	.....	.....	209	.....	.....	348	327	
	1914	991	.....	.....	.....	.....	.....	.....	.....	.....		1914	503	.....	.....	.....	.....	135	.....	368	
Michigan.....	1919	1,101	.....	.....	335	.....	.....	.....	214	552	Virginia.....	1919	1,081	.....	.....	.....	.....	.....	.....	1,081	
	1914	991	.....	.....	.....	.....	.....	.....	.....	991		1914	680	.....	.....	.....	.....	.....	.....	680	
New Jersey <sup>2</sup> .....	1919	487	.....	.....	133	.....	.....	.....	251	103	West Virginia <sup>1</sup> ...	1919	417	165	.....	.....	.....	.....	.....	252	

\* Includes 48 and under for 1914 and 1909.

\* Figures not available for 1914.

TABLE 9.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR STATES: 1919.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—															
	Establishments.	Wage earners (average number).	1 to 5 wage earners, inclusive.		6 to 20 wage earners, inclusive.		21 to 50 wage earners, inclusive.		51 to 100 wage earners, inclusive.		101 to 250 wage earners, inclusive.		251 to 500 wage earners, inclusive.		501 to 1,000 wage earners, inclusive.		Over 1,000 wage earners.	
			Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.
United States:																		
1919	195	41,000	1	4	12	152	15	544	45	3,424	71	10,902	31	10,313	17	11,842	3	4,479
1914	180	29,350	3	12	11	143	12	465	40	3,034	61	10,016	20	6,266	12	8,157	1	1,263
1909	208	38,429	2	7	9	118	26	988	52	4,094	74	11,958	31	10,496	13	9,241	1	1,527
Alabama	21	5,214					2	45	5	391	9	1,351	3	1,008	1	981	1	1,348
Illinois	5	2,120																
Kentucky	4	475					1	30			3	445						
Michigan	11	1,101					2	72	5	376	3	318	1	335				
New Jersey	3	487									2	235						
New York	0	2,210									5	775	4	1,440				
Ohio	42	9,703			19	3	102	10		714	16	2,708	6	2,126	6	4,124		
Pennsylvania	58	14,619	1	4	5	66	1	26	13	1,017	23	3,060	6	1,917	7	4,789	2	3,131
Tennessee	8	884			1	10			5	400	1	126	1	266				
Virginia	12	1,081			1	9	4	191	4	307	2	308						
West Virginia	4	417			1	12					3	405						

## MANUFACTURES.

TABLE 10.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919, 1914, AND 1909.

VALUE OF PRODUCT.	NUMBER OF ESTABLISHMENTS.			AVERAGE NUMBER OF WAGE EARNERS.			VALUE OF PRODUCTS.			PIG IRON, TONS.		
	1919	1914	1909	1919	1914	1909	1919	1914	1909	1919	1914	1909
All classes.....	195	160	208	41,600	29,356	38,429	\$794,466,558	\$317,653,983	\$391,429,283	30,277,291	23,269,731	25,651,798
Less than \$100,000.....	10	12	14	131	138	287	631,780	562,742	700,718	15,908	22,698	31,123
\$100,000 to \$500,000.....	23	44	108	1,012	8,054	10,207	7,077,009	14,139,153	54,735,742	206,346	3,349,367	3,536,186
\$500,000 to \$1,000,000.....	32	33		2,648			23,167,325	30,052,790		704,411		
\$1,000,000 and over.....	130	66	89	37,869	21,164	27,935	763,590,444	272,899,293	335,992,823	29,360,626	19,897,666	22,084,489
PER CENT DISTRIBUTION.												
All classes.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than \$100,000.....	5.1	7.5	6.7	0.3	0.5	0.7	0.1	0.2	0.2	0.1	0.1	0.1
\$100,000 to \$500,000.....	11.8	27.5	51.9	2.4	27.4	26.6	0.9	4.5	14.0	0.7	14.4	13.8
\$500,000 to \$1,000,000.....	16.4	23.7		6.4			2.9	9.4		2.3		
\$1,000,000 and over.....	66.7	41.3	41.3	90.9	72.1	72.7	96.1	85.9	85.8	96.9	85.5	86.1

TABLE 11.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919, 1914, AND 1909.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.					
	1919	1914	1909	Amount.			Per cent distribution.		
				1919	1914	1909	1919	1914	1909
Primary power, total.....	3,451	2,845	3,093	1,581,432	1,222,273	1,173,422	100.0	100.0	100.0
Owned.....	2,447	1,874	2,640	1,533,203	1,200,672	1,158,672	97.0	98.2	98.7
Steam.....	2,309	1,734	2,568	1,249,817	1,005,374	1,033,033	79.0	82.2	88.0
Engines.....	2,037	(1)	(1)	997,501	(1)	(1)	63.1		
Turbines.....	243	(1)	(1)	252,316	(1)	(1)	15.9		
Internal-combustion engines.....	137	104	60	283,015	194,037	125,230	17.9	15.9	10.7
Water wheels, turbines and motors.....	10	36	12	1,261	309		(1)	0.1	(1)
Rented.....	1,004	471	453	48,229	21,601	14,850	3.0	1.8	1.3
Electric.....	1,004	471	453	48,204	21,601	14,850	3.0	1.8	1.3
Other.....				25			(1)		
Electric.....	7,450	5,072	3,462	242,554	212,582	135,143	100.0	100.0	100.0
Rented.....	1,004	471	453	48,204	21,601	14,850	19.9	10.2	11.0
Generated by establishments reporting.....	6,446	4,601	3,009	194,350	190,981	120,293	80.1	89.8	89.0

<sup>1</sup> Not reported separately.<sup>2</sup> Less than one-tenth of 1 per cent.

TABLE 12.—FUEL CONSUMED, BY STATES: 1919 AND 1914.

STATE.	Census year.	COAL.		Coke (tons, 2,000 pounds).	Charcoal (bushels).	Fuel oils (barrels).	Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).
		Anthracite (tons, 2,240 pounds).	Bituminous (tons, 2,000 pounds).					
United States.....	1919	42,779	2,261,316	32,424,625	31,931,134	45,082	6,242	1,184,953
	1914	47,060	1,892,357	26,335,234	29,083,978	80,474	(1)	242,218
Alabama.....	1919		338,188	3,258,325	3,242,527			18,129
	1914		98,107	2,588,150	3,552,097			26,353
Illinois.....	1919		48,798	2,658,635		77		
	1914		50,723	1,941,514				
Indiana.....	1919		18,345	2,419,706				
Kentucky.....	1919		36,512	216,752				79,918
Michigan.....	1919	500	24,960	245,387	21,382,919		25	
	1914		14,701	190,204	18,816,032	3	(1)	
Missouri.....	1919		16,234	28,290		31,406		
New Jersey.....	1919	215	6,029	150,226	4,693,973			
New York.....	1919		54,050	2,393,017		5,858	33	66,441
	1914	1,341	67,098	1,718,352				
Ohio.....	1919		650,212	7,743,804		1,266	6,056	72,842
	1914		196,882	5,736,226	344,000	9,588	(1)	11,775
Pennsylvania.....	1919	42,064	965,252	10,833,369	189,010	2,688	128	249,900
	1914	45,369	919,391	11,157,627	499,970	75	(1)	178,780
Tennessee.....	1919		25,608	322,357				
	1914		19,808	235,780	323,221			
Virginia.....	1919		30,831	480,601				
	1914		38,122	478,026	700,006			
West Virginia.....	1919		10,004	277,977				75,647
Wisconsin.....	1919		7,836	289,980	1,549,515	396		617,736
All other states.....	1919		29,956	1,107,199	873,190	3,391		4,331
	1914	350	487,455	2,809,375	4,848,652	70,808	(1)	20,310

<sup>1</sup> Included in figures for fuel oils.

## SPECIAL STATISTICS.

**Principal materials.**—Table 13 presents the statistics for the principal materials used in the industry for the census years 1919, 1914, 1909, and 1904.

The total cost in 1919, \$626,675,640, was distributed as follows: Ore, 49.1 per cent; scrap, etc., 3.7; fluxes, 4.1; fuel for smelting, 36.6; and other materials, 6.5. Corresponding percentages for 1914 and 1909, for ore, scrap, etc., combined, were 59.5 and 60.1, respectively, with consequent lower percentage for other materials. The total consumption of iron material in 1919, 59,302,848 tons, comprised 94.2 per cent of ore of all kinds and 5.7 per cent scrap, mill cinder, etc. The percentage of mill cinders, scrap, etc., in 1914 was 4.8 and in 1909, 3.9. The consumption of foreign ore was 69.5 per cent less in 1919 than in 1914.

TABLE 13.—MATERIALS: 1919, 1914, 1909, AND 1904.

	1919	1914	1909	1904
Total cost.....	\$626,675,640	\$264,580,000	\$320,637,889	\$178,941,918
Iron ore:				
Tons.....	55,865,997	43,326,817	48,353,677	30,032,862
Cost.....	\$307,714,137	\$150,855,740	\$187,264,601	\$100,946,369
Domestic—				
Tons.....	55,325,415	41,556,642	46,605,930	29,202,944
Cost.....	\$303,356,013	\$141,276,713	\$177,589,789	\$96,206,240
Foreign—				
Tons.....	540,582	1,770,175	1,747,747	829,918
Cost.....	\$4,358,124	\$9,579,027	\$9,074,812	\$1,739,123
Crude iron ore—				
Domestic—				
Tons.....	53,696,285			
Cost.....	\$293,637,171			
Foreign—		( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Tons.....	370,794			
Cost.....	\$3,040,227			
Calced, roasted, or treated ore—				
Domestic—				
Tons.....	981,336			
Cost.....	\$5,989,872			
Foreign—		( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Tons.....	163,985			
Cost.....	\$1,274,144			
Manganiferous ore (domestic)—				
Tons.....	364,771	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Cost.....	\$2,220,499			
Pyrite cinder—				
Domestic—				
Tons.....	283,023			
Cost.....	\$1,508,471			
Foreign—		( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Tons.....	5,803			
Cost.....	\$13,753			
Scrap:				
Tons.....	1,057,808			
Cost.....	\$16,564,169			
Mill cinder, scale, slag, etc.:				
Tons.....	2,378,943	2,168,092	1,982,530	1,865,385
Cost.....	\$6,709,638	\$6,651,055	\$5,544,859	\$5,830,961
Fluxes:				
Tons (2,000 pounds).....	15,599,604	11,499,685	13,570,845	8,325,209
Cost.....	\$25,722,688	\$11,184,378	\$12,239,493	\$6,888,647
Fuel for smelting.....	\$229,201,344	\$85,436,530	\$105,994,112	.....
Coke—				
Tons (2,000 pounds) ..	34,605,700	26,883,082	31,436,536	19,739,671
Cost.....	\$223,250,007	\$83,499,448	\$102,184,423	\$57,126,997
Charcoal—				
Bushels.....	31,931,134	29,083,078	38,032,618	37,273,569
Cost.....	\$5,084,243	\$1,683,075	\$2,787,020	\$2,521,887
Anthracite—				
Tons.....	25,153	38,874	265,401	
Cost.....	\$194,280	\$158,877	\$904,102	
Bituminous coal—				
Tons (2,000 pounds) ..	23,568	60,337	115,173	\$3,239,305
Cost.....	\$72,214	\$95,630	\$168,561	
Cost of fuel for generating power and rent of power....	\$6,422,309	\$3,150,062	\$2,542,809	
All other materials, cost.....	\$34,341,805	\$7,302,295	\$7,052,015	\$4,388,752

<sup>1</sup> Includes \$5,389,144 reported by establishments engaged primarily in the manufacture of ferroalloys, but producing some pig iron.

<sup>2</sup> Included above, not reported separately.

**Production of pig iron, by states.**—Comparative statistics for the production of pig iron, by states, are given in Table 14 for 1919, 1914, and 1909. At each census Pennsylvania, Ohio, and Illinois have occupied the first three ranking positions. Indiana advanced from sixth place in 1914 to fourth place in 1919. Pennsylvania produced 40 per cent of the total production in 1919, a slightly smaller proportion than at the two preceding censuses, while nearly four-fifths of the total was reported from the district comprising Ohio, Pennsylvania, Illinois, and Indiana. Alabama and New York ranked next in order and were the only other states producing more than 1,000,000 tons during the year. The table also shows the number of furnaces in active establishments, and in this respect Alabama and New York follow Ohio, outranking Illinois and Indiana.

TABLE 14.—PIG-IRON PRODUCTION, BY STATES: 1919, 1914, AND 1909.

STATE.	Number of furnaces. <sup>1</sup>	Tons.	Per cent of total.	Rank of state.	Value.
United States:					
1919.....	411	30,543,187	100.0	.....	\$785,900,412
1914.....	353	23,280,731	100.0	.....	312,701,617
1909.....	388	25,051,798	100.0	.....	387,830,443
Pennsylvania:					
1919.....	149	12,014,112	39.3	1	314,253,542
1914.....	137	9,743,855	41.9	1	134,465,078
1909.....	145	10,911,676	42.5	1	167,588,407
Ohio:					
1919.....	77	7,073,337	23.2	2	176,592,660
1914.....	61	5,279,045	22.9	2	71,689,701
1909.....	67	5,446,971	21.2	2	82,048,712
Illinois:					
1919.....	24	2,528,888	8.3	3	61,734,928
1914.....	24	1,843,333	7.9	3	25,369,309
1909.....	23	2,468,772	9.6	3	38,299,897
Indiana:					
1919.....	10	2,292,562	7.5	4	51,691,497
Alabama:					
1919.....	42	2,111,381	6.9	5	54,771,825
1914.....	36	1,835,579	7.9	4	19,909,045
1909.....	40	1,764,544	6.9	4	21,221,707
New York:					
1919.....	25	1,800,994	6.2	6	50,212,451
1914.....	21	1,406,455	6.0	5	18,175,036
1909.....	18	1,717,091	6.7	5	26,699,413
Michigan:					
1919.....	12	420,301	1.4	7	13,512,968
1914.....	13	361,076	1.6	7	4,931,811
1909.....	12	327,044	1.3	9	5,094,564
Virginia:					
1919.....	13	291,117	1.0	9	9,232,864
1914.....	11	293,077	1.3	8	3,753,082
1909.....	17	387,328	1.6	7	5,324,997
Wisconsin:					
1919.....	5	277,597	0.9	11	7,829,928
1914.....	7	269,650	1.2	9	3,712,223
1909.....	6	285,454	1.1	13	4,691,351
West Virginia:					
1919.....	5	251,751	0.8	12	6,303,480
Tennessee:					
1919.....	10	182,033	0.6	14	6,150,705
1914.....	6	158,751	0.7	12	2,244,015
1909.....	15	333,416	1.3	8	4,044,687
Kentucky:					
1919.....	7	163,708	0.5	15	4,384,076
New Jersey:					
1919.....	5	118,418	0.4	16	3,850,353
Missouri:					
1919.....	3	69,051	0.2	17	2,433,959
All other states:					
1919.....	18	857,917	2.8	.....	23,105,178
1914.....	37	2,078,913	8.9	.....	28,524,320
1909.....	46	2,068,902	7.8	.....	31,819,728

<sup>1</sup> Number of completed furnaces at end of year in active establishments.

<sup>2</sup> Includes 1 electric-charcoal furnace in California.

**Production of pig iron, by smelting fuels.**—Table 15 classifies the pig-iron production, according to smelting fuels, for 1919, 1914, and 1909. Coke iron constituted

98.5 per cent of the total tonnage in 1919, 97.5 per cent in 1914, and 95.6 per cent in 1909, leaving but 1.5 per cent, 2.5 per cent, and 4.4 per cent, respectively, for all other fuels. Charcoal iron shows a slight proportionate decrease, namely, from 1.4 per cent of the total production in 1909 to 1.2 per cent in 1914 and to 0.9 per cent in 1919. The average value per ton for all grades of iron in 1919 was an increase of 91.3 per cent over the average unit value in 1914.

TABLE 15.—PIG-IRON PRODUCTION, BY SMELTING FUELS: 1919, 1914, AND 1909.

PRODUCT.	1919	1914	1909
Total value.....	\$801,062,345	\$317,653,983	\$391,429,283
Pig iron:			
Tons (2,240 lbs.).....	30,543,167	23,269,731	25,651,798
Value.....	\$785,930,412	\$312,761,617	\$387,830,443
Unit value, ton.....	\$25.73	\$13.44	\$15.12
Classified according to smelting fuel.			
Coke—			
Tons.....	30,097,220	22,787,890	24,522,152
Value.....	\$770,101,169	\$304,356,130	\$388,131,822
Unit value, ton.....	\$25.59	\$13.36	\$15.01
Anthracite, and anthracite and coke mixed—			
Tons.....	94,465	87,919	670,901
Value.....	\$2,975,470	\$1,256,603	\$10,902,150
Unit value, ton.....	\$31.50	\$14.29	\$16.34
Bituminous coal and coke mixed—			
Tons.....	35,745	118,632	89,420
Value.....	\$1,385,683	\$2,704,134	\$1,552,514
Unit value, ton.....	\$38.77	\$22.79	\$17.07
Charcoal—			
Tons.....	315,737	275,290	372,235
Value.....	\$11,498,110	\$4,444,690	\$7,183,657
Unit value, ton.....	\$36.42	\$16.15	\$19.30
All other products, value.....	\$15,101,933	\$4,892,366	\$3,593,840

<sup>1</sup> Includes 5 establishments engaged primarily in the manufacture of ferroalloys, but producing some pig iron. At prior censuses the industry included the blast-furnace ferroalloys.

<sup>2</sup> Includes a considerable quantity of ferromanganese pig iron.

<sup>3</sup> Includes a small quantity made with electricity and charcoal.

**Charcoal iron.**—In the early years of the industry charcoal was the chief smelting fuel and in 1859 nearly as much charcoal iron was produced as from all other fuels combined. Since that date the proportion has decreased until in 1919 it constituted less than 1 per cent of the total. Table 16 presents comparative statistics for the charcoal-iron branch of the industry for the census years 1919, 1914, 1909, and 1904.

Each census shows a decrease in the number of establishments and wage earners, and the production

decreased until 1919, when there was an increase of 14.7 per cent compared with 1914, the output, however, still not being up to the production of 1909 and prior years.

TABLE 16.—CHARCOAL IRON: 1919, 1914, 1909, AND 1904.

	1919	1914	1909	1904 <sup>1</sup>
Number of establishments.....	19	25	26	32
Salaried employees and wage earners.....	1,604	1,613	1,063	2,405
Salaried employees.....	164	143	157	200
Wage earners (average number).....	1,440	1,470	1,506	2,205
Capital.....	\$18,234,580	\$13,296,228	\$13,134,320	\$9,773,081
Salaries and wages.....	\$2,135,998	\$1,208,740	\$1,178,612	\$1,223,984
Salaries.....	\$338,991	\$250,426	\$261,001	\$280,350
Wages.....	\$1,797,007	\$949,314	\$917,521	\$963,634
Materials.....	\$9,152,805	\$3,715,978	\$5,609,250	\$5,058,104
Value of products.....	\$11,587,066	\$5,237,008	\$7,815,275	\$7,388,748
Pig iron—				
Tons (2,240 pounds).....	315,737	275,290	372,235	\$400,502
Value.....	\$11,498,110	\$4,444,690	\$7,183,657	\$6,993,085
All other products.....	\$89,956	\$792,318	\$631,618	\$306,663
Value added by manufacture.....	\$2,434,261	\$1,521,030	\$2,206,025	\$2,332,554
Principal materials:				
Iron ore—				
Tons.....	610,206	542,458	755,075	809,438
Cost.....	\$3,215,603	\$1,568,343	\$2,401,381	\$2,032,506
Mill clinder—				
Tons (2,240 pounds).....	4,780			
Cost.....	\$35,011			
Scrap—				
Tons (2,240 pounds).....	1,729	940	94	549
Cost.....	\$26,643	\$14,957	\$263	\$2,045
Fluxes—				
Tons (2,000 pounds).....	35,714	48,366	64,678	68,884
Cost.....	\$69,493	\$53,380	\$67,311	\$67,089
Charcoal—				
Bushels.....	31,931,134	29,033,978	38,032,618	\$39,756,724
Cost.....	\$5,084,243	\$1,683,075	\$2,787,026	\$2,604,180

<sup>1</sup> Not including a blast furnace operated by a penal institution.

<sup>2</sup> Includes 1 electric, charcoal furnace.

<sup>3</sup> Value of products less cost of materials.

<sup>4</sup> Includes 2,436,700 bushels of charcoal, the stumpage and labor cost of which was reported under "Wages" and "Materials" expense.

**Pig iron produced for consumption.**—Production for consumption was reported by 89 establishments in 1919. Table 17 presents the comparative statistics for the census years 1919, 1914, 1909, and 1904 bearing upon this subject. In 1919, 71 per cent of the pig iron produced was consumed in the works where produced, the corresponding percentages for 1914, 1909 and 1904 being 66.6, 61.8, and 59.7. A similar proportionate increase in the number of plants producing for consumption may also be noted. Of the amount available for sale, 31 per cent was purchased by steel works and rolling mills.

TABLE 17.—PIG-IRON PRODUCTION FOR CONSUMPTION: 1919, 1914, 1909, AND 1904.

	1919	1914	1909	1904	PER CENT OF TOTAL.				PER CENT OF INCREASE. <sup>1</sup>		
					1919	1914	1909	1904	1914-1919	1909-1914	1904-1909
Number of establishments.....	200	160	208	190	100.0	100.0	100.0	100.0	.....	.....	.....
Producing for consumption (or consumption and sale).....	89	64	57	52	44.5	40.0	27.4	27.4	.....	.....	.....
Producing for sale only.....	111	96	151	138	55.5	60.0	72.6	72.6	.....	.....	.....
Pig-iron production, tons (2,240 pounds).....	30,543,167	23,269,731	25,651,798	16,623,625	100.0	100.0	100.0	100.0	31.3	-9.3	54.3
For consumption in works of company producing.....	21,687,376	15,495,004	15,858,793	9,926,645	71.0	66.6	61.8	59.7	40.0	-2.3	59.8
Consumed by steel works and rolling mills during year.....	21,170,136	15,219,696	15,252,736	(2)	69.3	65.4	59.5	.....	39.1	-0.2	.....
Balance for foundries, etc.....	517,240	275,308	605,467	(2)	1.7	1.2	2.3	.....	87.9	-54.5	.....
For sale.....	8,855,791	7,774,727	9,793,595	6,696,980	29.0	33.4	38.2	40.3	13.8	-20.6	46.2
Purchased by steel works and rolling mills during year.....	2,750,935	2,209,961	3,824,153	2,264,688	9.0	9.5	14.9	13.6	24.5	-42.2	69.9
Balance for foundries, export, etc.....	6,104,856	5,564,766	5,969,442	4,432,292	10.0	23.9	23.3	26.7	9.7	-6.8	34.7

<sup>1</sup> A minus sign (—) denotes decrease.

<sup>2</sup> Figures not available.

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Production of pig iron, by grades.—Table 18 shows for the census years 1904 to 1919 the production of pig iron, classified by grades, together with the per cent of total represented by each grade and the per cent of increase for each census period.

The proportion of pig iron for steel making—basic,

Bessemer, and low-phosphorus grades—has steadily increased from 70.7 per cent of the total in 1909 to 74.6 per cent in 1914, and 79.4 per cent in 1919. A considerable increase in production over 1914 is found in each grade except low phosphorus and forge or mill.

TABLE 18.—PIG-IRON PRODUCTION, BY GRADES: 1919, 1914, 1909, AND 1904.

[Ton, 2,240 pounds.]

GRADE.	1919	1914	1909	1904	PER CENT OF TOTAL.				PER CENT OF INCREASE. <sup>1</sup>		
					1919	1914	1909	1904	1914-1919	1909-1914	1904-1909
Total.....	30,543,167	23,269,731	25,651,798	16,623,625	100.0	100.0	100.0	100.0	31.3	-9.3	54.3
Basic.....	14,597,535	9,465,853	7,741,759	2,533,940	47.8	40.7	30.2	15.4	54.2	22.3	203.1
Bessemer.....	9,374,950	7,577,792	10,147,052	8,894,534	30.7	32.6	39.5	53.5	23.7	-25.3	14.1
Low phosphorus (below 0.4 per cent).....	289,720	305,738	248,720	192,705	0.9	1.3	1.0	1.2	-5.2	22.9	20.0
Foundry.....	4,792,901	4,825,100	5,539,410	3,675,310	15.7	18.6	21.6	22.1	10.8	-21.9	50.7
Malleable.....	1,090,844	730,910	934,211	318,964	3.6	3.1	3.6	1.9	49.2	-21.8	194.7
Forge or mill.....	287,520	488,172	589,685	601,677	0.9	2.1	2.3	3.6	-41.1	-16.8	-2.5
White, mottled, and miscellaneous.....	55,418	32,202	110,810	98,627	0.2	0.1	0.4	0.6	75.2	-70.9	12.4
Castings made direct from blast furnaces.....	53,704	14,384	16,181	9,469	0.2	0.1	0.1	0.1	273.3	-11.1	70.9
Ferroalloys.....	( <sup>2</sup> )	329,580	325,970	230,259	.....	1.4	1.3	1.6	.....	0.8	16.7

<sup>1</sup> A minus sign (-) denotes decrease.

<sup>2</sup> Included in report on "Ferroalloys."

Production, by method of delivery or casting.—The production of pig iron, classified according to the method of delivery or casting for 1919, 1914, and 1909, with number of establishments and per cent of total for each class, is shown in Table 19, together with statistics for Pennsylvania and Ohio, the principal pig-iron states.

TABLE 19.—PRODUCTION, BY METHOD OF DELIVERY OR CASTING: 1919, 1914, AND 1909.

METHOD AND STATE.	NUMBER OF ESTABLISHMENTS.			PRODUCTION, TONS.			PER CENT OF TOTAL.		
	1919	1914	1909	1919	1914	1909	1919	1914	1909
United States.....	200	100	208	30,543,167	23,269,731	25,651,798	100.0	100.0	100.0
Delivered molten.....	59	44	38	18,138,453	11,936,791	12,197,686	59.4	51.3	47.6
Machine cast.....	80	50	49	7,740,050	6,007,417	5,095,797	25.3	25.8	19.9
Sand cast.....	117	111	172	3,970,309	4,681,867	7,655,568	13.0	20.1	29.8
Chill cast.....	23	19	19	634,045	620,272	685,566	2.1	2.7	2.7
Castings made direct from furnace.....	36	32	15	53,704	14,384	10,181	0.2	0.1	0.1
Pennsylvania.....	63	62	66	12,014,112	9,743,855	10,911,676	100.0	100.0	100.0
Delivered molten.....	23	19	18	8,026,094	5,712,789	5,887,507	66.8	58.6	54.0
Machine cast.....	36	24	23	3,071,311	2,696,520	2,837,576	25.6	27.7	26.0
Sand cast.....	30	33	50	727,101	1,112,180	1,907,514	6.1	11.4	17.5
Chill cast.....	11	6	7	173,418	217,756	274,510	1.4	2.2	2.5
Castings made direct from furnace.....	14	14	5	15,591	4,613	4,503	0.1	( <sup>1</sup> )	( <sup>1</sup> )
Ohio.....	42	33	40	7,073,337	5,279,045	5,446,971	100.0	100.0	100.0
Delivered molten.....	17	11	9	4,036,462	2,797,254	2,723,700	57.0	53.0	50.0
Machine cast.....	24	16	12	2,078,218	1,635,242	1,945,036	29.4	31.0	17.3
Sand cast.....	17	21	33	677,157	630,639	1,625,073	9.6	12.0	29.8
Chill cast.....	5	5	3	274,172	200,012	152,824	3.9	3.9	2.8
Castings made direct from furnace.....	8	8	1	7,340	3,898	338	0.1	0.1	( <sup>1</sup> )
All other states.....	95	75	102	11,455,718	8,246,831	9,293,151	100.0	100.0	100.0
Delivered molten.....	19	14	11	6,075,307	3,423,751	3,580,479	53.0	41.5	38.6
Machine cast.....	26	16	14	2,597,129	1,675,655	1,314,185	22.7	20.3	14.1
Sand cast.....	70	57	89	2,566,051	2,933,048	4,122,981	22.4	35.8	44.4
Chill cast.....	7	8	9	186,458	205,504	253,504	1.6	2.5	2.8
Castings made direct from furnace.....	14	13	9	30,773	5,873	11,280	0.3	0.1	0.1

<sup>1</sup> Less than one-tenth of 1 per cent.

Furnaces, number and capacity.—Table 20 gives the number and daily capacity rating of the com-

pleted blast furnaces in active establishments at the end of the respective census years 1919, 1914, and 1909, by states and by smelting fuels. The average daily furnace capacity has increased from 261 tons in 1909 to 311 tons in 1914, and to 337 tons in 1919. The ratio of the pig-iron production for the year to the total rated daily capacity was 221 in 1919 as compared with 213 in 1914 and 253 in 1909.

TABLE 20.—BLAST FURNACES—ACTIVE ESTABLISHMENTS: 1919, 1914, AND 1909.

STATE AND KIND OF FUEL.	NUMBER.			DAILY CAPACITY—TONS (2,240 POUNDS).		
	1919	1914	1909	1919	1914	1909
United States.....	411	352	388	138,347	109,411	101,447
Coke.....	382	315	332	136,334	107,348	97,426
Bituminous coal and coke.....	3	8	3	240	8,146	8,190
Anthracite and coke.....	5	8	25	438	617	2,545
Charcoal.....	21	29	31	1,335	1,446	1,476
Alabama.....	42	36	40	10,060	8,356	8,370
Coke.....	39	33	37	9,800	8,146	8,190
Charcoal.....	3	3	3	260	210	180
Colorado—coke.....	5	6	6	1,705	1,800	1,800
Connecticut—charcoal.....	2	3	3	30	48	48
Georgia.....	.....	.....	2	.....	.....	130
Coke.....	.....	.....	1	.....	.....	70
Charcoal.....	.....	.....	1	.....	.....	60
Illinois—coke.....	24	24	23	11,675	10,254	7,775
Indiana—coke.....	16	10	7	8,290	4,500	3,050
Kentucky.....	7	3	6	1,150	470	710
Coke.....	7	3	5	1,150	470	700
Charcoal.....	.....	.....	1	.....	.....	10
Maryland.....	5	5	5	1,615	1,815	1,415
Coke.....	4	4	4	1,600	1,800	1,400
Charcoal.....	1	1	1	15	15	15
Massachusetts—charcoal.....	1	2	2	16	28	30
Michigan.....	12	13	12	1,530	1,565	1,208
Coke.....	3	3	2	755	675	321
Charcoal.....	9	10	10	775	890	887
Minnesota—coke.....	3	1	1	1,100	250	225
Missouri.....	3	1	2	335	60	208
Coke.....	1	.....	1	175	.....	150
Charcoal.....	2	1	1	160	60	58
New Jersey.....	5	2	6	1,200	357	1,440
Coke.....	5	2	5	1,200	357	1,290
Anthracite and coke.....	.....	.....	1	.....	.....	150

TABLE 20.—BLAST FURNACES—ACTIVE ESTABLISHMENTS: 1919, 1914, AND 1909—Continued.

STATE AND KIND OF FUEL.	NUMBER.			DAILY CAPACITY—TONS (2,240 POUNDS).		
	1919	1914	1909	1919	1914	1909
New York—coke.....	25	21	18	9,176	7,135	6,508
Ohio.....	77	61	67	28,918	21,524	21,017
Coke.....	74	57	66	28,678	21,190	21,008
Bituminous coal and coke.....	3	3	1	240	325	9
Charcoal.....		1	1		9	
Pennsylvania.....	149	137	145	55,557	46,934	41,707
Coke.....	142	124	117	55,109	45,896	39,294
Bituminous coal and coke.....		1		438	400	2,395
Anthracite and coke.....	5	8	24	617	21	18
Charcoal.....	2	4	4	10		
Tennessee.....	10	6	15	1,139	620	1,569
Coke.....	10	5	13	1,139	605	1,545
Charcoal and coke.....		1	2		15	24
Texas—coke.....	1		1	100		70
Virginia.....	13	11	17	1,830	1,486	1,982
Coke.....	13	10	16	1,830	1,486	1,970
Charcoal.....		1	1		20	12
Washington—coke.....	1			65		
West Virginia—coke.....	5	3	4	1,099	899	1,125
Wisconsin.....	5	7	6	1,153	1,310	1,060
Coke.....	4	5	5	1,023	1,180	935
Charcoal.....	1	2	1	130	130	125

Number and capacity of completed furnaces.—The number and rated capacity of all completed blast furnaces in all establishments, both active and idle, on December 31, 1919, are given, by states, in Table 21, classified according to mineral fuels and charcoal fuel. The former, designated as "coke," includes a few furnaces using anthracite and mixed coke and coal fuels.

The tonnage production of pig iron for the year was approximately 60 per cent of the total annual capacity of all furnaces as compared with 50 per cent in 1914.

TABLE 21.—BLAST FURNACES—NUMBER AND CAPACITY OF COMPLETED FURNACES, ALL ESTABLISHMENTS (ACTIVE AND IDLE), DECEMBER 31, 1919.

STATE.	NUMBER.			ANNUAL CAPACITY—TONS (2,240 POUNDS).		
	Total.	Coke. <sup>1</sup>	Charcoal.	Total.	Coke. <sup>1</sup>	Charcoal.
COMPLETED FURNACES.						
United States:						
1919.....	453	421	32	50,222,400	49,628,000	594,400
1914.....	451	409	42	44,408,000	43,756,700	645,300
Alabama.....	44	41	3	3,685,925	3,633,925	52,000
Colorado.....	6	6		625,000	625,000	
Connecticut.....	2	2		12,000		12,000
Georgia.....	4	2	2	128,000	96,000	32,000
Illinois.....	25	25		4,085,850	4,085,850	
Indiana.....	16	10		2,871,200	2,871,200	
Kentucky.....	7	7		425,000	425,000	
Maryland.....	5	4	1	484,000	425,000	4,000
Massachusetts.....	1			5,000		5,000
Michigan.....	12	3	9	554,500	285,000	289,500
Minnesota.....	3	3		401,750	401,750	
Mississippi.....	1			3,500		3,500
Missouri.....	3	1	2	119,000	63,000	56,000
New Jersey.....	4	4		407,000	407,000	
New York.....	27	26	1	3,351,700	3,346,700	5,000
Ohio.....	79	79		10,644,525	10,644,525	
Oregon.....	1	1		15,000	15,000	
Pennsylvania.....	165	160	5	19,739,850	19,727,450	12,400
Tennessee.....	16	14	2	622,300	551,300	41,000
Texas.....	1	1		36,000	36,000	
Virginia.....	18	17	1	894,000	869,000	25,000
West Virginia.....	5	5		587,500	587,500	
Wisconsin.....	8	6	2	523,800	486,800	57,000

<sup>1</sup> Including anthracite and mixed coke and coal.

Blast furnaces, by capacity groups.—Table 22 gives, by states, for 1919 and 1914 the number of blast fur-

naces in active establishments, classified by size groups as to daily capacity, together with the aggregate daily capacity of each group.

The capacity of nearly every group shows a material increase, the greatest both actual and relative, appearing in the group "500 tons and over."

TABLE 22.—BLAST FURNACES, BY CAPACITY GROUPS: 1919 AND 1914.

STATE.	Cen- sus year.	Total.	DAILY CAPACITY—TONS OF PIG IRON (2,240 POUNDS).					
			Less than 100 tons.	100 to 199 tons.	200 to 299 tons.	300 to 399 tons.	400 to 499 tons.	500 tons and over.
United States:								
Daily capacity.....	1919	133,347	2,013	8,994	15,297	19,744	34,334	57,965
1914.....	1914	109,411	1,697	7,967	13,206	19,208	34,808	32,526
Number of furnaces.....	1919	411	33	65	62	59	78	114
1914.....	1914	352	36	56	57	59	79	65
Alabama.....	1919	42	4	11	13	13	1	
1914.....	1914	36	4	8	13	11		
Colorado.....	1919	5			1	4		
1914.....	1914	6			2	4		
Illinois.....	1919	24			1	2	4	17
1914.....	1914	24			2	5	10	7
Indiana.....	1919	16					10	16
1914.....	1914	10						
Kentucky.....	1919	7	2	2	3			
1914.....	1914	3		2	1			
Maryland.....	1919	5	1				4	
1914.....	1914	5	1				3	1
Michigan.....	1919	12	7	3		2		
1914.....	1914	13	7	4		2		
Minnesota.....	1919	3			1		2	
1914.....	1914	1			1			
Missouri.....	1919	3	1	2				
1914.....	1914	1	1					
New Jersey.....	1919	5		2	1		2	
1914.....	1914	2		1	1			
New York.....	1919	25		1	6	9		9
1914.....	1914	21		1	6	8	1	5
Ohio.....	1919	77	2	7	11	11	29	17
1914.....	1914	61	1	9	7	12	20	12
Pennsylvania.....	1919	149	6	18	21	15	35	54
1914.....	1914	137	10	21	17	15	34	40
Tennessee.....	1919	10	5	3	2			
1914.....	1914	6	3	1	2			
Virginia.....	1919	13	1	11	1			
1914.....	1914	11	3	6	2			
West Virginia.....	1919	5		1	1	1	1	1
1914.....	1914	3			2		1	
Wisconsin.....	1919	5		3		2		
1914.....	1914	7	1	3	1	2		
All other states <sup>1</sup> .....	1919	5	4	1				
1914.....	1914	5	5					

<sup>1</sup> Connecticut, Massachusetts, Texas, and Washington.

Duration of runs.—Comparative statistics for 1919 and 1914 are given in Table 23 for furnaces grouped according to size, measured by height of stacks, and according to duration of runs.

In 1919 the average run was 896 days as compared with 837 days in 1914. Including furnaces engaged in the production of ferroalloys, the 1919 average duration was 874 days, this being the figure comparable with that of 1914, when all furnaces are considered.

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TABLE 23.—BLAST FURNACES, GROUPED BY SIZE AND DURATION OF RUNS: 1919 AND 1914.

DURATION OF RUN.	TOTAL. <sup>1</sup>		GROUPED ACCORDING TO HEIGHT.									
	1919	1914	Less than 60 feet.		60 to 69 feet.		70 to 79 feet.		80 to 89 feet.		90 feet and over.	
			1919	1914	1919	1914	1919	1914	1919	1914	1919	1914
Number of furnaces reporting runs.....	306	287	5	7	20	27	65	61	122	103	94	89
Number of runs (last 3, when reported) <sup>2</sup> .....	594	664	12	16	37	59	128	152	225	234	192	203
Average length, days.....	874	837	333	415	786	728	697	738	802	782	1,037	1,041
Furnaces classified according to time group:												
Less than 500 days—												
Number of runs.....	185	201	11	11	17	23	59	54	59	77	39	36
Average length, days.....	295	300	314	216	255	255	286	310	320	306	285	325
500 to 1,000 days—												
Number of runs.....	189	280	1	4	9	22	36	67	90	95	53	72
Average length, days.....	744	728	540	627	746	704	750	709	725	738	776	748
1,000 to 1,500 days—												
Number of runs.....	131	123			5	9	23	17	48	41	55	56
Average length, days.....	1,207	1,215			1,164	1,227	1,175	1,230	1,207	1,197	1,224	1,222
1,500 to 2,000 days—												
Number of runs.....	69	52		1	3	3	9	9	23	15	34	24
Average length, days.....	1,672	1,712		1,764	1,798	1,756	1,717	1,690	1,611	1,691	1,691	1,726
2,000 to 2,500 days—												
Number of runs.....	15	19			3	1		3	3	4	9	11
Average length, days.....	2,252	2,206			2,274	2,025		2,124	2,237	2,214	2,250	2,242
2,500 days and over—												
Number of runs.....	5	9				1	1	2	2	2	2	4
Average length, days.....	3,202	2,882				3,284	2,756	2,760	3,747	2,981	2,879	2,793

<sup>1</sup> Includes 15 iron blast furnaces running on ferroalloys (1 "less than 60 feet"; 3, "70 to 79 feet"; and 6, "80 to 89 feet").

<sup>2</sup> In some cases only 1 or 2 completed runs.

The record for the maximum furnace production for a day, a week, and a month, as reported at the census of 1909, stands unbroken, viz, the production of 918 tons of pig iron by the Edgar Thompson furnace "K," March 30, 1905; 5,315 tons by the Duquesne furnace No. 1 for a week in March, 1906; and 21,272 tons by the Edgar Thompson furnace "K" in March, 1905. The maximum production for a day since 1914 was made by furnace No. 6 of the Illinois Steel Co., November 20, 1919, 822 tons; for a week by same furnace in August, 1919, 5,063 tons; and for a month by furnace "A" of the Youngstown Sheet & Tube Co., March, 1918, 19,664 tons.

The record for both the longest run and the maximum output on a single lining is held by the Ensley furnace No. 3 of the Tennessee Coal, Iron & Railroad Co., which terminated February 29, 1920, a run of 3,845 days with a production of 1,429,707 gross tons of pig iron, and this without being once banked. The average daily output was 371.8 tons. Prior thereto the record for longest run on a single lining was held by the Schoenberger furnace No. 2, 3,431 days, terminating in August, 1906, banked 11 times, and 69 days lost in banking; and for maximum production on a single

lining by one of the Eliza furnaces of the Jones & Laughlin Steel Co., 1,353,625 tons on a run of 3,172 days terminating January 4, 1913, with one banking and a loss of 26 days, and an average daily output of 427 tons.

**Gas engines using blast-furnace gas.**—In 1919 there were 195 gas engines with a total rating of 514,470 horsepower, using blast-furnace gas, 115 for driving blowing engines and 80 for the production of electric current.

**Slag pits.**—There were 94 slag pits reported in 1919 serving 103 furnaces, with a production of 5,031,743 tons of granulated slag.

**Pig-iron casting machines.**—There was reported for the industry in the way of casting equipment, 149 pig-iron casting machines, comprising 79 of the Heyl and Patterson type, 56 of the Uehling type, and 14 of other patterns. In 1914 the total number was 112 and in 1909, 104. In 1919, 7,746,656 tons of pig iron were machine cast; in 1914, 6,007,417; and in 1909, 5,096,797 tons.

**Materials, products, and equipment in detail, by states.**—Detail statistics for 1919 of materials, products, and equipment, by states, are given in Table 24.



TABLE 24.—DETAILED STATISTICS OF NUMBER OF ESTABLISHMENTS, MATERIALS, PRODUCTS, AND EQUIPMENT, BY STATES: 1919.

[Ton, 2,240 pounds, except as otherwise stated.]

	United States.	Alabama.	Illinois.	Indiana.	Michigan.	New York.	Ohio.	Pennsylvania.	Tennessee.	Virginia.	All other states. <sup>1</sup>
Number of establishments.....	200	21	5	3	11	9	42	63	8	12	26
<b>MATERIALS.</b>											
Total cost.....	\$626,675,640	\$44,871,012	\$51,526,758	\$40,022,880	\$10,298,421	\$40,311,052	\$137,688,107	\$250,349,277	\$4,566,316	\$8,270,165	\$38,773,652
Iron ore:											
Tons.....	55,855,997	5,025,183	4,702,522	4,156,579	793,176	3,712,658	12,449,590	20,935,653	386,007	567,734	3,136,805
Cost.....	\$307,714,137	\$14,772,862	\$26,160,200	\$20,001,389	\$4,058,220	\$17,655,357	\$71,456,066	\$132,031,628	\$1,415,291	\$2,917,312	\$17,245,804
Crude iron ore—											
Domestic—											
Tons.....	53,696,285	4,879,129	4,665,261	4,152,560	791,672	3,674,191	12,430,650	19,806,526	362,141	530,605	2,543,550
Cost.....	\$293,637,171	\$13,929,561	\$25,977,838	\$19,086,449	\$4,050,150	\$17,205,742	\$71,387,088	\$124,205,284	\$1,255,121	\$1,661,412	\$13,983,017
Foreign—											
Tons.....	370,794							162,555	4,635		203,004
Cost.....	\$3,040,227							\$1,774,775	\$83,161		\$1,202,291
Calined, roasted, or treated ore—											
Domestic—											
Tons.....	981,336	32,114				37,319		508,759		155,150	247,904
Cost.....	\$5,989,872	\$143,090				\$445,032		\$3,377,857		\$791,230	\$1,232,663
Foreign—											
Tons.....	163,985							77,538	616		85,831
Cost.....	\$1,274,144							\$707,861	\$6,790		\$490,487
Manganiferous ore—											
Domestic—											
Tons.....	364,771	80,976	37,061	4,019		1,148	6,435	172,069		7,662	55,401
Cost.....	\$2,220,490	\$527,444	\$182,445	\$14,940		\$4,583	\$37,657	\$1,078,265		\$52,970	\$327,105
Foreign—											
Tons.....											
Cost.....											
Pyrite cinder—											
Domestic—											
Tons.....	283,023	32,964	200		1,504		12,505	148,206	18,615	68,514	515
Cost.....	\$1,508,471	\$172,787	\$420		\$2,061		\$31,320	\$832,586	\$90,213	\$377,947	\$1,151
Foreign—											
Tons.....	5,803									5,803	
Cost.....	\$43,753									\$43,753	
Scrap (not produced at furnace in 1919):											
Tons.....	1,057,008	210,257	42,980	58,916	1,448	31,513	147,792	488,529	2,288	4,311	63,874
Cost.....	\$16,564,109	\$3,637,255	\$739,448	\$869,256	\$38,491	\$521,629	\$2,120,315	\$7,487,192	\$40,910	\$70,544	\$1,021,129
Mill cinder, scale, slag, fine dust, etc. (not produced by furnace reporting):											
Tons.....	2,378,943	90,789	162,420	226,379	14,877	49,323	611,927	979,680	39,069	15,290	199,180
Cost.....	\$5,709,188	\$137,590	\$298,011	\$286,141	\$41,643	\$147,702	\$1,841,877	\$3,244,343	\$186,101	\$75,241	\$440,939
Fluxing materials:											
Tons (2,000 pounds).....	15,599,604	711,903	1,052,534	922,106	119,503	1,057,850	3,484,609	6,857,889	132,325	228,723	1,032,662
Cost.....	\$25,722,688	\$1,237,678	\$1,298,231	\$948,774	\$117,910	\$1,482,913	\$6,054,043	\$12,378,781	\$140,863	\$336,125	\$1,727,370
Fuel for smelting.....	\$220,201,344	\$19,007,177	\$20,007,272	\$16,101,838	\$5,878,402	\$17,855,628	\$46,070,272	\$81,460,456	\$2,341,837	\$3,572,825	\$16,300,137
Coke—											
Tons (2,000 pounds).....	34,605,700	3,216,168	2,595,548	2,366,334	245,353	2,313,570	7,715,245	13,335,275	322,357	452,962	2,042,888
Cost.....	\$223,250,607	\$18,402,140	\$20,007,272	\$16,101,838	\$1,836,257	\$17,855,628	\$46,000,139	\$81,224,835	\$2,341,837	\$3,572,825	\$15,308,336
Coal—											
Tons (2,000 pounds).....	51,739							23,103			
Cost.....	\$266,494							\$70,183			
Charcoal—											
Bushels.....	31,831,134	3,242,527			21,382,919			189,010			7,116,678
Cost.....	\$5,684,243	\$905,037			\$4,042,145			\$39,260			\$997,801
All other materials, cost.....	\$40,764,114	\$6,078,450	\$3,022,987	\$1,815,982	\$163,755	\$2,647,823	\$9,534,535	\$13,746,877	\$432,314	\$1,298,118	\$2,023,273
<b>PRODUCTS.</b>											
Total value.....	\$801,062,345	\$57,018,105	\$64,762,411	\$52,533,807	\$13,533,739	\$51,601,999	\$170,233,435	\$317,675,868	\$6,217,593	\$10,097,810	\$48,387,572
The blast-furnace industry, value.....	\$794,466,558	\$57,018,105	\$64,762,411	\$52,533,807	\$13,533,739	\$51,601,999	\$170,233,435	\$311,080,081	\$6,217,593	\$10,097,810	\$48,387,572
Subsidiary pig-iron products (other industries).....	\$6,595,787							\$6,595,787			
Pig iron:											
Tons (gross).....	30,543,167	2,111,381	2,528,883	2,292,582	420,301	1,890,994	7,073,337	12,014,112	182,033	291,117	1,738,442
Value.....	\$785,960,412	\$54,771,825	\$61,734,928	\$51,591,467	\$13,612,906	\$50,212,451	\$170,592,690	\$314,253,542	\$6,150,705	\$9,232,864	\$47,906,974
For consumption by company producing—											
Tons.....	21,687,376	1,004,601	2,105,640	( <sup>1</sup> )	( <sup>1</sup> )	873,810	5,327,132	9,331,630		( <sup>1</sup> )	1,011,581
Assigned value.....	\$523,533,054	\$22,348,145	\$49,883,117	( <sup>1</sup> )	( <sup>1</sup> )	\$19,061,919	\$120,343,702	\$235,317,019		( <sup>1</sup> )	\$26,113,169
For sale—											
Tons.....	8,855,791	1,106,720	423,243	( <sup>1</sup> )	( <sup>1</sup> )	1,017,184	1,746,205	2,682,482	182,033	( <sup>1</sup> )	726,861
Value.....	\$262,427,358	\$32,423,680	\$11,851,811	( <sup>1</sup> )	( <sup>1</sup> )	\$31,120,532	\$50,248,988	\$78,936,523	\$6,150,705	( <sup>1</sup> )	\$21,793,805
Blast-furnace gas used as fuel for steam and for gas engines, coal equivalent, tons (gross).....	7,259,875	883,805	853,644	686,708	( <sup>1</sup> )	450,807	1,498,289	2,666,255	( <sup>1</sup> )	( <sup>1</sup> )	158,027
Blast-furnace department (tons, gross).....	4,877,003	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	1,064,876	2,024,590	( <sup>1</sup> )	( <sup>1</sup> )	122,549
Other departments—											
Tons (gross).....	2,282,872	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	433,414	641,665			35,478
Assigned value.....	\$5,260,637	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	\$968,302	\$1,374,812			\$165,377
Slag (granulated, slag sand, slag roofing, paving, etc.).....	\$750,585	\$42,232									
All other products, including amount received for custom work.....	\$6,090,711	( <sup>1</sup> )	( <sup>1</sup> )			\$33,108	\$528,421	\$44,260	\$5,844	( <sup>1</sup> )	\$55,080
Pig iron, classified by smelting fuel:											
Coke—											
Tons.....	30,097,220	2,087,783	2,528,883	2,292,582	198,804	1,890,994	7,037,592	11,918,501	182,033	291,117	1,668,946
For consumption.....	21,686,861	1,004,661	2,105,640	( <sup>1</sup> )	( <sup>1</sup> )	873,810	5,327,096	9,331,630		( <sup>1</sup> )	1,011,121
For sale.....	8,410,359	1,083,122	423,243	( <sup>1</sup> )	( <sup>1</sup> )	1,017,184	1,710,496	2,686,871	182,033	( <sup>1</sup> )	657,825
Value.....	\$770,101,109	\$53,620,013	\$61,734,928	\$51,591,467	\$6,021,719	\$50,212,451	\$175,207,027	\$311,194,581	\$6,150,705	\$9,232,864	\$45,135,414
Bituminous coal and coke:											
Tons.....	35,745										
Value.....	\$1,385,663										

<sup>1</sup> All other states embrace: Colorado, 1 establishment, Connecticut, 1; Kentucky, 4; Maryland, 2; Massachusetts, 1; Minnesota, 2; Missouri, 3; New Jersey, 3; Texas, 1; Washington, 1; West Virginia, 4; and Wisconsin, 3.<sup>2</sup> Includes 8 establishments with \$5,389,144 cost of materials, engaged primarily in the manufacture of ferroalloys, which produced 265,876 tons of pig iron, value \$6,592,236.<sup>3</sup> Includes 25,133 gross tons of anthracite (28,171 net tons) costing \$194,280 and 23,538 net tons of bituminous coal, costing \$72,219.<sup>4</sup> Included in totals but amount not shown to avoid disclosure of individual operations.

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TABLE 24.—DETAILED STATISTICS OF NUMBER OF ESTABLISHMENTS, MATERIALS, PRODUCTS, AND EQUIPMENT, BY STATES: 1919—Continued.

[Ton, 2,240 pounds, except as otherwise stated.]

	United States.	Alabama.	Illinois.	Indiana.	Michigan.	New York.	Ohio.	Pennsylvania.	Tennessee.	Virginia.	All other states. <sup>1</sup>
<b>PRODUCTS—continued.</b>											
Pig iron, classified by smelting fuel—											
Continued.											
Anthracite coal and coke—											
Tons.....	94,465							94,465			
Value.....	\$2,975,470							\$2,975,470			
Charcoal—											
Tons.....	315,737	23,598			221,497			1,146			89,496
Value.....	\$11,498,110	\$1,151,812			\$7,491,247			\$83,491			\$2,771,560
Pig iron, classified by grades (tons):											
Basic.....	14,597,535	(1)	(1)	2,095,431	(1)	944,783	2,550,134	6,625,835			631,509
For consumption.....	12,690,787	(1)	(1)	(1)	(1)	834,278	1,940,038	5,725,410			510,016
For sale.....	1,906,748	(1)	(1)	(1)	(1)	110,505	604,096	900,425			121,493
Bessemer.....	9,374,950		1,421,931		(1)	(1)	3,356,798	4,094,214			409,763
For consumption.....	8,558,930		(1)				3,288,846	3,509,524			463,389
For sale.....	816,020		(1)				67,950	585,690			35,374
Low phosphorus.....	289,726	(1)				(1)	(1)	153,718	(1)		
For consumption.....	9,665	(1)					(1)	(1)			
For sale.....	280,061	(1)				(1)	(1)	(1)			
Foundry.....	4,702,961	1,129,650	(1)		346,611	717,550	649,610	817,883	150,615	290,086	455,411
For consumption.....	103,034	104,445	(1)	(1)	(1)	(1)	4,468	11,887			29,173
For sale.....	4,599,927	1,025,205	(1)	(1)	(1)	(1)	645,153	805,996	150,615	290,086	427,238
Malleable.....	1,000,344		197,892	(1)	(1)	148,095	364,614	157,516			129,060
For consumption.....	13,634		(1)	(1)							5,134
For sale.....	1,076,710		(1)	(1)	(1)	148,095	364,614	157,516			123,926
Forgo or mill.....	237,529	16,891					122,632	148,006			
For consumption.....	168,590	(1)					(1)	(1)			
For sale.....	118,939	(1)					(1)	(1)			
White, mottled, and miscellaneous grades.....	50,418	(1)		(1)		5,907	11,662	1,349		(1)	
For consumption.....	9,405	(1)		(1)						(1)	
For sale.....	47,013	(1)				5,907	11,662	1,349		(1)	
Castings made direct from blast furnaces.....	53,704	(1)	772	(1)		(1)	7,340	15,591			488
Pig iron, classified by method of delivery or casting:											
Delivered molten to steel works, etc.....	18,138,453	888,087	1,937,047	1,790,527		743,763	4,036,452	8,026,694			709,283
Machine cast.....	7,746,656	111,522	590,499	494,094	180,060	607,703	2,078,216	3,071,311			553,281
Sand cast.....	3,970,309	959,440			240,241	478,943	677,167	727,101	182,033	281,722	423,672
Chill cast.....	634,045	126,345					274,172	173,415		9,895	51,718
Castings made direct from blast furnaces.....	53,704	26,987	772	1,941		585	7,340	15,591			488
<b>EQUIPMENT.</b>											
Furnaces in active establishments:											
Completed furnaces at end of year—											
Number.....	411	42	24	16	12	25	77	149	10	13	43
Daily capacity, tons.....	138,347	10,000	11,675	8,290	1,530	9,176	28,918	55,557	1,139	1,830	10,172
Active during the year—											
Number.....	335	30	24	16	12	21	77	140	8	12	36
Daily capacity, tons.....	132,114	9,651	11,675	8,290	1,530	7,676	28,918	52,817	854	1,680	9,023
Coke furnaces—											
Number.....	359	37	24	16	3	21	75	133	8	12	30
Daily capacity, tons.....	130,291	9,520	11,675	8,290	755	7,676	28,778	52,369	854	1,680	8,688
Bituminous coal and coke mixed furnaces—											
Number.....	2						2				
Daily capacity, tons.....	140						140				
Anthracite coal and coke mixed furnaces—											
Number.....	5							5			
Daily capacity, tons.....	438							438			
Charcoal furnaces—											
Number.....	10	2			9			2			6
Daily capacity, tons.....	1,245	125			775			10			335
Idle during the entire year—											
Number.....	27	3				4		10	2	1	7
Daily capacity, tons.....	6,433	409				1,500		2,940	285	150	1,149
Coke furnaces—											
Number.....	25	2				4		10	2	1	6
Daily capacity, tons.....	6,343	334				1,500		2,940	285	150	1,134
Charcoal furnaces—											
Number.....	2	1									1
Daily capacity, tons.....	90	75									15
Banked, relined, or rebuilding at end of year—											
Coke.....											
Number.....	50	2	6	3	1	10	6	20	2	3	6
Daily capacity, tons.....	20,506	475	2,700	1,540	80	4,025	2,246	7,160	285	375	1,640
Other fuels (charcoal, anthracite, bituminous coal and coke)—											
Number.....	3				1		1	1			
Daily capacity, tons.....	255				90		90	75			
New furnaces completed since 1914—											
Number (all coke).....	81	1	1	6		3	4	12			4
Daily capacity, tons.....	14,545	100	550	3,130		1,500	2,000	5,615			1,650
In course of construction at end of year—											
Number (coke 4, charcoal 1).....	5							1	1		3
Daily capacity, tons.....	1,720							600	70		1,050
Abandoned or dismantled since 1914—											
Number (coke).....	8	1						3		1	3
Daily capacity, tons.....	1,560	200						800		150	410
Pig-iron casting machines.....	149	3	10	9		11	38	67			13
Granulated slag pits:											
Number.....	94	1	5	5		5	22	42			13
Number of blast furnaces served.....	109	1	8	10		5	25	45			13
Gas engines using blast-furnace gas:											
Number.....	195		12	57		29	22	57			18
Blowing blast furnaces.....	115		9	23		21	8	37			17
Production of electric current.....	80		3	34		8	14	20			1
Horsepower.....	513,470		35,000	171,400		50,000	69,000	146,700			41,370

<sup>1</sup> Included in totals but amount not shown to avoid disclosure of individual operations.

<sup>2</sup> Not including 1 stack of 200 tons capacity abandoned April, 1912.

## MANUFACTURES.

## GENERAL TABLES.

Comparative statistics, by states.—Table 25 gives the comparative statistics for the principal items, number of establishments, average number of wage earners, primary horsepower, wages, cost of materials,

and value of products for the census years 1919, 1914, and 1909.

Detailed statistics, by states.—Table 26 is a detailed statement, by states, census of 1919.

TABLE 25.—COMPARATIVE SUMMARY, BY STATES: 1919, 1914, AND 1909.

STATE.	Cen- sus year.	Num- ber of estab- lish- ments.	Wage earnors (aver- age num- ber).	Primary horse- power.	Wages.	Mate- rials.	Value of prod- ucts.	STATE.	Cen- sus year.	Num- ber of estab- lish- ments.	Wage earnors (aver- age num- ber).	Primary horse- power.	Wages.	Mate- rials.	Value of prod- ucts.
					Expressed in thousands.								Expressed in thousands.		
United States <sup>1</sup> ...	1919	195	41,680	1,581,432	\$73,769	\$621,286	\$794,487	Ohio.....	1919	42	9,793	359,224	\$20,224	\$137,680	\$179,234
	1914	160	29,356	1,222,273	22,781	204,580	317,654		1914	33	5,786	232,179	5,171	60,739	72,909
	1909	208	38,429	1,173,422	24,607	320,638	391,429		1909	40	7,205	215,739	5,090	68,425	83,699
Alabama.....	1919	21	5,214	138,951	7,177	44,871	57,018	Pennsylvania <sup>1</sup> .....	1919	58	14,619	564,455	27,318	244,960	311,080
	1914	15	3,547	126,573	1,985	13,891	20,066		1914	52	11,518	477,588	9,337	115,501	135,806
	1909	19	3,783	106,189	2,077	15,477	21,236		1909	66	14,521	476,680	9,457	142,074	168,578
Illinois.....	1919	5	2,129	80,118	3,847	51,527	64,762	Tennessee.....	1919	8	884	15,978	883	4,566	6,218
	1914	5	1,450	94,160	1,348	21,794	25,882		1914	6	503	6,590	233	1,682	2,245
	1909	6	2,493	70,453	1,793	30,903	38,300		1909	13	1,143	18,150	519	3,381	4,653
Michigan.....	1919	11	1,101	6,367	1,710	10,298	13,534	Virginia.....	1919	12	1,081	19,855	1,027	8,270	10,098
	1914	12	991	14,045	782	8,877	5,450		1914	8	689	15,210	862	3,282	3,772
	1909	11	1,016	17,403	632	4,224	5,824		1909	14	1,320	17,320	546	4,418	5,389
New York.....	1919	9	2,210	146,500	4,020	40,311	51,002	All other states.....	1919	29	4,629	249,984	7,554	78,797	100,921
	1914	8	1,832	97,749	1,325	16,287	18,486		1914	21	3,040	158,189	2,248	27,527	32,998
	1909	9	2,298	95,416	1,758	20,917	20,621		1909	30	4,560	156,072	2,735	30,814	37,129

<sup>1</sup> Does not include statistics of 5 establishments engaged primarily in the manufacture of ferroalloys which produced 235,376 tons of pig iron valued at \$6,592,236 in 1919

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TABLE 26.—DETAILED STATEMENT, BY STATES: 1919.

STATE.	Number of establishments.	PERSONS ENGAGED IN THE INDUSTRY.								WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.						EXPENSES.	
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks, etc.		Wage earners.			Total.	16 and over.		Under 16.		Capital.	Salaries and wages.	
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.	Female.		Officials.	Clerks, etc.
								Maximum month.	Minimum month.								
United States.....	195	46,950	41	1,341	3,031	883	41,660	Ja 51,467	Oct 33,628	46,460	40,402	54	4	.....	\$302,416,541	\$6,506,884	\$6,925,164
Alabama.....	21	5,785	1	155	339	76	5,214	Ja 6,435	My 4,009	5,848	5,833	15	.....	.....	76,762,096	588,170	772,988
Illinois.....	5	2,436	.....	97	151	59	2,129	Ja 2,571	Oct 1,219	2,418	2,417	1	.....	.....	57,167,029	393,185	336,598
Kentucky.....	4	513	.....	20	14	4	475	Ja 697	Je 168	536	536	.....	.....	.....	7,261,031	54,680	25,854
Michigan.....	11	1,203	.....	39	45	18	1,101	Ja 1,173	No 1,033	1,139	1,137	2	.....	.....	15,820,266	123,442	89,927
New Jersey.....	3	534	.....	16	18	13	487	Ja 763	Oct 352	395	393	2	.....	.....	6,227,350	81,549	41,979
New York.....	9	2,362	.....	60	76	16	2,210	Ja 2,558	Oct 1,589	2,271	2,269	2	.....	.....	68,297,002	358,252	228,470
Ohio.....	42	11,055	.....	311	747	204	9,793	Ja 12,137	Oct 6,105	11,211	11,203	8	.....	.....	162,007,954	1,262,048	1,614,880
Pennsylvania.....	58	16,667	39	412	1,230	367	14,619	Ja 17,554	Oct 12,786	15,707	15,689	18	.....	.....	267,740,371	2,561,073	2,911,553
Tennessee.....	8	966	1	29	42	10	884	Ja 1,236	Jy 759	1,008	1,004	4	.....	.....	12,135,057	158,760	58,023
Virginia.....	12	1,160	.....	35	38	6	1,081	Ja 1,748	Je 687	1,604	1,600	.....	4	.....	12,455,938	122,270	55,235
West Virginia.....	4	524	.....	29	60	18	417	Se 708	Je 252	746	746	.....	.....	.....	7,977,593	86,000	72,407
All other states <sup>1</sup> .....	18	3,751	.....	138	271	92	3,250	.....	.....	3,577	3,575	2	.....	.....	108,564,848	690,496	667,270

STATE.	EXPENSES—continued.						Value of products.	Value added by manufacture.	POWER.						Electric horsepower generated in establishments reporting.	
	Salaries and wages—Con.	For contract work.	Rent and taxes.		For materials.				Primary horsepower.							
			Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.			Total.	Owned.				Rented. <sup>2</sup>		
										Steam engines (not turbines).	Steam turbines.	Internal-combustion engines.	Water power. <sup>3</sup>			
United States.....	\$73,769,395	\$602,203	\$384,763	\$20,551,798	\$385,662,843	\$235,023,653	\$704,466,558	\$173,180,002	1,581,432	907,501	252,316	253,015	371	48,229	194,350	
Alabama.....	7,177,159	4,677	.....	789,485	24,302,536	20,568,470	57,018,105	12,147,093	138,951	108,401	20,003	.....	.....	1,547	9,990	
Illinois.....	3,846,614	.....	.....	2,929,894	30,835,824	20,686,934	64,762,411	13,235,653	80,118	54,670	10,148	15,300	.....	.....	36,155	
Kentucky.....	505,772	.....	.....	90,455	2,252,448	1,359,177	4,465,149	853,524	13,481	13,106	375	.....	.....	.....	979	
Michigan.....	1,719,380	.....	.....	566,518	4,904,869	6,303,552	13,533,739	3,235,318	6,367	4,805	1,125	.....	.....	437	2,403	
New Jersey.....	653,049	.....	.....	110,875	1,518,493	1,229,118	3,858,352	1,110,741	12,058	10,960	1,970	.....	.....	28	300	
New York.....	4,019,818	.....	177,013	3,135,691	21,999,130	18,311,922	51,601,999	11,290,947	146,500	78,055	12,047	44,320	.....	12,078	5,778	
Ohio.....	20,223,931	112,954	431	3,552,844	88,780,004	48,906,103	179,233,435	41,547,328	359,224	222,164	70,494	38,655	.....	28,011	48,283	
Pennsylvania.....	27,318,410	520,119	187,372	3,044,117	162,077,295	81,982,893	311,080,081	66,119,948	584,455	401,468	78,442	80,635	140	2,770	10,849	
Tennessee.....	882,634	.....	9,900	273,265	1,969,757	2,596,559	6,217,593	1,651,277	15,978	15,016	950	5	7	.....	1,570	
Virginia.....	1,026,940	.....	354	171,164	4,417,554	3,852,611	10,097,816	1,827,651	19,855	14,835	4,870	.....	150	.....	1,089	
West Virginia.....	849,587	.....	.....	95,258	3,770,058	1,740,431	6,411,939	901,450	19,360	11,290	8,100	.....	.....	.....	8,798	
All other states <sup>1</sup> .....	5,486,101	54,543	9,643	5,193,232	37,930,905	28,995,902	86,185,939	19,259,132	204,185	62,761	39,792	98,200	74	3,358	69,150	

<sup>1</sup> All other states embrace: Colorado, 1 establishment; Connecticut, 1; Indiana 3; Maryland, 2; Massachusetts, 1; Minnesota, 2; Missouri 3; Texas, 1; Washington, 1; and Wisconsin, 3.

<sup>2</sup> Includes water wheels and turbines (irrespective of ownership of water supply) and water motors (operated by water from city mains).

<sup>3</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants).

# FERROALLOYS.

## GENERAL STATISTICS.

General character of the industry.—In 1914 and at prior censuses, the blast-furnace ferroalloys, spiegel-eisen, ferromanganese, ferrosilicon, etc., were included in the blast-furnace industry, though reported separately, and the ferroalloys produced by electro-thermic, electrochemical, or other processes were included in the group of the chemical industry designated as "chemical substances produced by the aid of electricity."

The present report presents the statistics for ferroalloys as a classified industry inclusive of (1) blast-furnace products; and (2) electric-furnace products.

Comparative figures for previous years are not available for the industry as a whole. The general statistics will be found in Table 33.

States, ranked by value of products.—The leading states, ranked by value of products for the classified industry, are Pennsylvania, Ohio, Tennessee, Virginia, New York, Alabama, and Colorado, but there is a large production of ferroalloys by establishments engaged primarily in the manufacture of other products, amounting in the aggregate to \$17,598,259, which production is included in the statistics for products as given in Table 32, and the distribution of these products, by states, would materially affect the rank of some of the states.

Persons engaged in the industry.—There were 2,750 persons engaged in the industry in 1919, comprising 2,344 wage earners, 8 proprietors, 49 salaried officers of corporations, 110 superintendents and managers, and 239 clerks or other subordinate salaried employees. The females reported include 64 clerks and 9 wage earners over 16 years of age.

Wage earners, by months.—Table 27 shows, by months and by states, the number of wage earners employed on representative days, and the per cent

the number reported for the minimum month is of the maximum month.

Prevailing hours of labor.—Figures are not available to show the changes since the last census in the prevailing hours of labor for the establishments involved. The industry calls for continuous furnace operations, and Table 28 indicates that the majority of the wage earners are found in the higher groups.

Size of establishments, by average number of wage earners.—Table 29 gives the average number of wage earners employed in the industry, classified according to number per establishment. There were 7 establishments, or 23.3 per cent of the total number, that employed over 100 wage earners per establishment, aggregating 66.6 per cent of all wage earners for the industry.

Size of establishments, by value of products.—The industry is one of relatively large units, as shown by Table 30. Only 3 establishments in 1919 reported products less than \$100,000 per establishment, these representing but a fraction of 1 per cent of the wage earners and of the total value of products.

Character of ownership.—Of the 30 establishments constituting the classified industry, 27 are corporations, and 3 are owned by individuals or firms.

Number and horsepower of types of prime movers.—The power equipment reported for the industry aggregates 37,087 horsepower. While rented electric power formed only 12.3 per cent of the total primary power, a large proportion of the owned power was transformed into electric power, representing 59.8 per cent of the total owned power. The details of power equipment are given in Table 33.

Fuel consumed.—Table 31 gives the statistics, by states, of the quantities of the different kinds of fuel consumed, including smelting fuel as well as fuel consumed for power purposes.

TABLE 27.—WAGE EARNERS, BY MONTHS, FOR STATES: 1919.

[Month of maximum employment for each state is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
United States.....	2,344	2,033	2,092	2,278	2,237	2,096	2,066	1,879	1,971	2,103	2,415	2,572	2,756	64.1
Male.....	2,335	2,024	2,083	2,269	2,258	2,087	2,056	1,870	1,962	2,095	2,406	2,563	2,747	64.0
Female.....	9	9	9	9	9	9	10	9	9	8	9	9	9	80.0
Colorado.....	59	88	79	55	48	50	46	46	54	49	47	64	74	52.8
Pennsylvania.....	1,500	1,714	1,058	1,491	1,392	1,459	1,391	1,349	1,362	1,493	1,504	1,585	1,602	78.7
Tennessee.....	150	149	149	145	138	104	142	171	180	153	152	156	161	57.8
All other states.....	635	982	806	688	682	485	483	313	375	408	712	767	919	31.9

# FERROALLOYS.

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TABLE 28.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK FOR STATES: 1919.

STATE.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—						STATE.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—					
		48.	Be- tween 48 and 54.	54.	Be- tween 54 and 60.	60.	Over 60.			48.	Be- tween 48 and 54.	54.	Be- tween 54 and 60.	60.	Over 60.
United States.....	2,344	92	.....	75	224	845	1,108	Pennsylvania.....	1,500	41	.....	.....	26	712	721
Colorado.....	59	31	.....	.....	28	.....	.....	Tennessee.....	150	.....	.....	.....	.....	.....	150
								All other states.....	635	20	.....	75	170	133	237

TABLE 29.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR STATES: 1919.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—											
	Estab- lish- ments.	Wage earners (average number).	1 to 5 wage earners, inclusive.		6 to 20 wage earners, inclusive.		21 to 50 wage earners, inclusive.		51 to 100 wage earners, inclusive.		101 to 250 wage earners, inclusive.		Over 250 wage earners.	
			Estab- lish- ments.	Wage earners.	Estab- lish- ments.	Wage earners.	Estab- lish- ments.	Wage earners.	Estab- lish- ments.	Wage earners.	Estab- lish- ments.	Wage earners.	Estab- lish- ments.	Wage earners.
United States.....	30	2,344	3	11	4	57	10	341	6	375	4	453	3	1,102
Colorado.....	3	59	1	3	.....	.....	2	56	.....	.....	.....	.....	.....	.....
Pennsylvania.....	10	1,500	.....	.....	.....	.....	5	165	.....	.....	2	233	3	1,102
Tennessee.....	3	150	.....	.....	1	15	1	32	.....	.....	1	103	.....	.....
All other states.....	14	635	2	8	3	42	2	88	6	375	1	122	.....	.....

TABLE 30.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919.

VALUE OF PRODUCT.	Num- ber of estab- lish- ments.	Average number of wage earners.	Value of products.	Value added by manufac- ture.	VALUE OF PRODUCT.	PER CENT DISTRIBUTION.			
						Num- ber of estab- lish- ments.	Average number of wage earners.	Value of products.	Value added by manufac- ture.
All classes.....	30	2,344	\$38,583,984	\$10,485,408	All classes.....	100.0	100.0	100.0	100.0
Less than \$100,000.....	3	11	70,383	27,530	Less than \$100,000.....	10.0	0.4	0.2	0.3
\$100,000 to \$500,000.....	14	452	3,770,588	1,242,944	\$100,000 to \$500,000.....	46.7	19.3	9.8	11.9
\$500,000 to \$1,000,000.....	6	445	3,891,467	1,312,185	\$500,000 to \$1,000,000.....	20.0	19.0	10.1	12.5
\$1,000,000 and over.....	7	1,430	30,851,540	7,902,749	\$1,000,000 and over.....	23.2	61.3	79.9	75.7

TABLE 31.—FUEL CONSUMED, BY STATES: 1919.

STATE.	COAL.		Coke (tons, 2,000 pounds).	Fuel oils (bar- rels).	Gas- oline and other volatile oils (bar- rels).	Gas (1,000 cubic feet).	STATE.	COAL.		Coke (tons, 2,000 pounds).	Fuel oils (bar- rels).	Gas- oline and other volatile oils (bar- rels).	Gas (1,000 cubic feet).
	Anthra- cite <sup>1</sup> (tons, 2,240 pounds).	Bitumi- nous (tons, 2,000 pounds).						Anthra- cite <sup>1</sup> (tons, 2,240 pounds).	Bitumi- nous (tons, 2,000 pounds).				
United States.....	2,005	83,651	815,322	1,060	350	4,499	Pennsylvania.....	901	51,267	601,797	127	97	4,499
Colorado.....	284	1,060	608	.....	.....	.....	Tennessee.....	.....	.....	41,955	.....	.....	.....
							All other states.....	820	31,324	80,962	933	253	.....

<sup>1</sup> Includes some semianthracite.

## SPECIAL STATISTICS.

**Materials and products.**—Table 32 gives the detailed statistics for the principal materials and the products, for the census of 1919.

The production of blast-furnace ferroalloys in 1919 aggregated 324,273 tons as compared with 329,580 tons in 1914, a decrease of 1.6 per cent. In 1909 the

production of blast-furnace ferroalloys was 326,970 tons, and in 1904, 280,259 tons. The production for 1919 includes 84,010 tons of spiegeleisen, 182,966 tons of ferromanganese, 53,516 tons of ferrosilicon, and 3,781 tons of ferrophosphorus and other ferroalloys.

## MANUFACTURES.

TABLE 32.—MATERIALS AND PRODUCTS: 1919.

	Tons (2,000 pounds).	Cost.		Tons (2,000 pounds).	Value.
<b>MATERIALS.</b>			<b>PRODUCTS.</b>		
Total cost.....		\$38,172,204	Total value.....		\$56,182,243
The ferroalloys industry.....		28,008,576	The classified industry.....		38,583,984
Other industries producing ferroalloys as subsidiary products.....		10,073,628	Ferroalloys, subsidiary products of other industries.....		17,598,259
Ores.....	886,227	22,947,159	Blast-furnace establishments.....		38,484,505
Domestic.....	621,865	9,885,281	Electric-furnace establishments.....		17,697,738
Foreign.....	264,362	13,061,878			
Manganese or manganiferous.....	512,580	17,153,507	Ferroalloys.....	Tons.	
Chrome.....	59,115	2,123,508	Perromanganese.....	385,806	49,326,769
All other.....	314,532	3,670,084	Spiegeleisen.....	185,616	25,670,127
Fluxes.....	310,909	655,875	Ferrosilicon.....	84,010	3,675,689
Fuel for smelting.....		5,281,103	Ferrophosphorus.....	86,022	4,821,711
Coke.....	715,731	4,740,285	Other ferroalloys (ferrochrome, molybdenum, titanium, tungsten, vanadium, etc).....	4,757	516,231
Other.....		540,823		25,401	14,643,011
Electric power purchased.....	Kilowatt hours.	983,328	Sand cast.....	148,875	
All other materials including fuel for power.....	187,750,817	8,304,734	Machine cast.....	131,419	
			Chill cast.....	105,299	
			Delivered in molten condition.....	213	
			All other products.....		6,855,474

## GENERAL TABLE.

Detailed statement, by states.—Table 33 presents, by states, the detailed statistics for the industry for 1919.

The 30 establishments include 14 making blast-furnace products and 16 electric-furnace products: the

blast-furnace ferroalloy establishments being distributed, by states, as follows—Colorado, 1; New Jersey, 1; Ohio, 2; Pennsylvania, 7; Tennessee, 2; and Virginia, 1.

TABLE 33.—DETAILED STATEMENT, BY STATES: 1919.

STATE.	Number of establishments	PERSONS ENGAGED IN THE INDUSTRY.										WAGE EARNERS DEC. 15 OR NEAREST REPRESENTATIVE DAY.					Capital.	EXPENSES.	
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks, etc.		Average number.	Wage earners.		Total.	16 and over.		Under 16.		Officials.	Clerks, etc.			
					Male.	Female.		Maximum month.	Minimum month.		Male.	Female.	Male.	Female.					
							Number, 15th day of—												
United States.....	30	2,750	8	159	175	64	2,344	Ja 2,033	Jy 1,879	3,204	3,192	10	2	.....	\$42,364,729	\$732,084	\$439,080		
Colorado.....	3	87	.....	19	7	2	59	Ja 88	Jy 46	74	73	.....	1	.....	729,399	37,931	13,749		
Pennsylvania.....	10	1,679	7	34	106	32	1,500	Ja 1,714	Jy 1,349	1,715	1,707	7	1	.....	28,079,783	274,707	329,015		
Tennessee.....	3	175	1	13	8	3	150	Au 180	My 104	174	174	.....	.....	.....	595,042	40,194	11,472		
All other states <sup>1</sup> .....	14	809	.....	93	54	27	635	.....	.....	1,241	1,238	3	.....	.....	12,960,505	379,252	136,894		

STATE.	EXPENSES—continued.						Value of products.	Value added by manufacture.	POWER.					Electric horsepower generated in establishments reporting.
	Salaries and wages—Continued.	For contract work.	Rent and taxes.		For materials.				Primary horsepower.					
			Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.			Total.	Owned.			Rented (electric.)	
										Steam engines (not turbines).	Steam turbines.	Internal-combustion engines.		
United States.....	\$3,571,487	\$47,338	\$13,377	\$873,052	\$22,039,508	\$6,059,068	\$38,583,984	\$10,485,408	37,087	32,235	185	88	4,570	19,456
Colorado.....	95,829	.....	240	6,905	237,576	74,646	529,562	217,340	301	.....	.....	.....	301	.....
Pennsylvania.....	2,553,609	5,140	6,900	465,503	19,360,571	4,200,322	31,419,460	7,858,587	26,831	25,385	.....	.....	1,446	18,774
Tennessee.....	113,663	.....	897	6,991	311,918	421,700	1,297,837	564,219	2,005	2,000	.....	.....	5	21
All other states. <sup>1</sup> .....	808,386	42,198	5,340	393,653	2,129,443	1,362,400	5,337,125	1,845,282	7,950	4,850	185	88	2,827	661

<sup>1</sup> All other states embrace: Alabama, 1 establishment; California, 2; District of Columbia, 1; Iowa, 1; Maryland, 1; New Jersey, 1; New York, 3; Ohio, 2; Virginia, 1; and Washington, 1.

# STEEL WORKS AND ROLLING MILLS.

## GENERAL STATISTICS.

**General character of the industry.**—Under this heading is included all establishments engaged primarily in the conversion of iron into steel, and the hot-rolling of iron and steel. Besides the 500 establishments falling within the classified industry, 7 establishments engaged primarily in other lines of manufacture produced steel or did hot-rolling as subsidiary lines. These are included in the following industries: Foundry and machine shop products, 3; steam-railroad cars, 2; electrical machinery, apparatus and supplies, 1; and iron and steel forgings, 1. Data for these establishments are not included in the general statistics of this report, but the value of the steel castings and rolled steel products manufactured in 1919 was \$7,143,128, of which \$1,861,964 was for consumption by the producing establishment and \$5,281,164 was for sale. In many establishments manufacture or fabrication was carried on beyond the primary stage, and the statistics include the manufacture and fabrication of products of rolling mills when the operations are in direct connection with the rolling mill. This includes, for example, the tin-dipping department of a black-plate rolling mill, the wire-drawing department of a wire-rod mill, and the pipe-and-tube department of a skelp mill when parts of one plant. The finished products, however, are considered in connection with the statistics for the respective industries to which they relate and the statistics for tin plate and terne-plate and for wire, in the sections of this report pertaining to these products, cover total production, whether made in independent plants or in departments of rolling mills.

**Summary and comparison with earlier censuses.**—Table 34 summarizes the more important data relative to the industry for the censuses 1879 to 1919, inclusive, and gives the percentages of increase or decrease for the census periods.

**Classes of establishments.**—The establishments are divided into three classes: (1) Those equipped with steel furnaces and hot rolls (steel works and rolling mills), represented by 145 establishments, with products valued at \$1,865,305,000; (2) those equipped with steel furnaces only (steel works), 112 establishments and \$151,861,147 in value of products; and (3) those equipped with hot rolls only (rolling mills), 243 establishments and \$811,736,249 in value of products. The first group includes most of the larger establishments. All steel plants which are operated in conjunction

with blast furnaces have rolling departments. Statistics for these groups are given in Table 35 for 1919, 1914, and 1909, for the United States, and Pennsylvania and Ohio, and for Illinois and New York for 1919, these being the four states which ranked highest.

**Principal states, ranked by value of products.**—Table 36 gives, by states, ranked according to value of products, the average number of wage earners, value of products, and value added by manufacture, together with the relative rank held and the per cent of the total reported for each state under each classification. Colorado and Minnesota, included among "All other states," ranked fourteenth and sixteenth, respectively, on the basis of value of products.

**Persons engaged in the industry.**—Personnel statistics for 1919, 1914, and 1909 are presented in Table 37. Except in office work, where they form 23.6 per cent of the total, females constitute less than 1 per cent, and less than one-half of one-tenth of 1 per cent of the wage earners were under 16 years of age. In 1914 wage earners under 16 constituted three-tenths of 1 per cent of the total number and in 1909 one-half of 1 per cent.

**Wage earners, by months.**—Statistics of the number of wage earners, by months, for the United States, 1919, 1914, and 1909, and by states for 1919, are given in Table 38. The variation between minimum and maximum months in 1919 was somewhat greater than in 1914 and 1909, the percentages being 66.2, 77.4, and 75.8, respectively, seemingly an indication of an increase in labor turnover and less stability of the labor situation in the industry. The states showing the greatest variation are Delaware and Kentucky, and the least variation New Jersey and Alabama.

**Prevailing hours of labor.**—Table 39 distributes the wage earners according to the prevailing hours of labor per week, comparative figures being shown for the United States for 1919, 1914, and 1909, and by states for 1919 and 1914, or for 1919 when 1914 figures are not available. In 1919, 31.8 per cent were employed in establishments where the prevailing hours of labor per week were 48 or less; in 1914, 8 per cent; and in 1909, 7.6 per cent. The group "44 and under" carried 15 per cent of all wage earners in 1919. On the other hand, in 1909, 68.6 per cent of the wage earners were employed in establishments where the prevailing hours of labor were 60 or more per week compared with 55.5 in 1914 and 42.1 in 1919.



**Size of establishments, by average number of wage earners.**—The movement towards the absorption of smaller establishments into greater aggregations of capital and facilities is shown by the classification according to wage-earner groups, presented in Table 40. Of a total increase, 1914 to 1919, of 73 establishments in the industry, 65 employed over 250 wage earners each, and while there was an increase in the number of wage earners in these establishments of 128,986, there was an actual decrease of 2,614 in the number employed in the smaller groups. In 1914 the average number of wage earners per establishment was 582, and in 1919, 750.

**Size of establishments, by value of products.**—Table 41 groups the establishments according to value of products for 1919, 1914, and 1909. Two-thirds of the establishments and over 95 per cent of the wage earners, value of products, and value added by manufacture were reported in the group with products of "\$1,000,000 and over." The average value of products per establishment was \$5,658,000 in 1919; \$2,151,000 in 1914; and \$2,210,000 in 1909, the increase for 1919 with respect to 1914 being largely due to high prices.

**Character of ownership.**—In Table 42 the number of establishments, average number of wage earners, and value of products is shown, classified by character of ownership, for 1919, 1914, and 1909. Corporation ownership is growing, both absolutely and relatively, the number being 481 compared with only 19 of all other classes.

**Number and horsepower of types of prime movers.**—Comparative power statistics for the last three census years are given in Table 43. Of the total horsepower, electric power, either rented or generated by the establishments using it, constituted 62 per cent in 1919, 44.6 per cent in 1914, and 34.1 per cent in 1909. The rapidly increasing use of rented or purchased electric power is disclosed, the percentage the same bears to the total primary power having increased from 2.8 per cent in 1909 to 6.7 per cent in 1914, and to 18.2 per cent in 1919.

**Fuel consumed.**—Table 44 presents, by states, comparative statistics of the quantities and kinds of fuel used for all purposes in the industry. The figures for gas include natural and manufactured gas.

TABLE 34.—COMPARATIVE SUMMARY: 1919, 1914, 1909, 1904, 1899, 1889, AND 1879.

	1919	1914	1909	1904	1899	1889	1879	PER CENT OF INCREASE. <sup>1</sup>					
								1914-1919	1909-1914	1904-1909	1899-1904	1889-1899	1879-1889
Number of establishments.....	500	427	440	415	445	415	451	17.1	-4.3	-7.5	-0.7	7.2	-8.0
Persons engaged.....	421,861	274,162	280,762	221,956	190,825	(*)	(*)	53.9	5.1	17.5	16.3	.....	.....
Proprietors and firm members..	35	52	47	64	122	(*)	(*)	-32.7	10.6	-23.6	-47.5	.....	.....
Salaries employees.....	46,738	25,394	20,639	14,330	7,454	(*)	(*)	84.0	23.0	44.0	92.2	.....	.....
Wage earners (average number)	375,089	248,716	240,076	207,562	183,249	137,766	99,103	50.8	3.6	15.7	13.3	33.0	(*)
Primary horsepower.....	3,820,917	2,706,553	2,100,978	1,649,209	1,100,801	535,430	(*)	41.2	28.8	27.4	49.8	105.6	.....
Capital.....	\$2,656,518,417	\$1,258,370,594	\$1,004,735,111	\$700,182,310	\$430,232,431	\$276,224,301	\$120,373,603	111.1	25.2	43.5	62.7	55.8	129.5
Salaries and wages.....	737,517,850	225,658,325	189,392,222	140,352,488	111,769,244	79,510,047	42,706,082	226.8	19.1	34.9	25.6	40.6	85.8
Salaries.....	99,880,420	37,515,927	26,191,464	17,860,495	9,433,368	(*)	(*)	166.3	43.2	46.6	89.3	.....	.....
Wages.....	637,637,430	188,142,398	163,200,768	122,491,993	102,335,876	(*)	(*)	238.9	15.3	33.2	19.7	.....	.....
Paid for contract work.....	2,963,415	251,082	94,237	115,563	547,216	.....	.....	1,080.3	166.4	-18.5	-78.9	.....	.....
Rent and taxes.....	88,102,211	6,063,587	3,657,314	* 2,616,080	* 2,058,847	.....	.....	1,353.0	65.8	.....	27.1	.....	.....
Cost of materials.....	1,680,575,758	590,825,692	657,500,850	441,204,432	390,895,277	217,174,230	132,651,408	184.4	-10.1	49.0	12.9	80.0	63.7
Value of products.....	2,828,902,376	918,664,565	985,722,534	678,965,026	597,217,716	333,044,366	207,242,116	207.9	-6.8	46.3	12.9	79.3	60.7
Value added by manufacture <sup>2</sup> .....	1,148,326,618	327,838,873	328,221,678	232,760,594	206,316,439	115,870,136	74,580,708	250.3	-0.1	41.0	12.8	78.1	55.3

<sup>1</sup> A minus sign (-) denotes decrease.

<sup>2</sup> Comparable figures not available.

<sup>3</sup> Percentage omitted because figures are not strictly comparable.

\* Exclusive of internal revenue.

\* Value of products less cost of materials.

# STEEL WORKS AND ROLLING MILLS.

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TABLE 35.—CLASSES OF ESTABLISHMENTS: 1919, 1914, AND 1909.

STATE.	Census year.	Total.	Steel works and rolling mills combined.	Steel works only.	Rolling mills only.	PER CENT OF TOTAL.		
						Steel works and rolling mills.	Steel works only.	Rolling mills only.
United States:								
Number of establishments.....	1919	500	145	112	243	29.0	22.4	48.6
	1914	427	113	96	218	26.4	22.5	51.1
	1909	446	89	99	258	20.0	22.2	57.8
Value of products.....	1919	\$2,828,902,376	\$1,865,304,980	\$151,861,147	\$811,736,249	65.9	5.4	28.7
	1914	918,664,565	503,874,694	39,783,006	285,006,805	64.7	4.3	31.0
	1909	985,722,534	607,036,138	45,876,568	332,809,828	61.6	4.7	33.6
Pennsylvania:								
Number of establishments.....	1919	198	56	36	106	28.3	18.2	53.5
	1914	178	57	27	94	32.0	15.2	52.8
	1909	189	44	33	112	23.3	17.5	59.2
Value of products.....	1919	\$1,296,412,070	\$871,036,483	\$51,675,317	\$373,700,270	67.2	4.0	28.8
	1914	448,106,324	310,292,397	10,516,470	127,287,457	69.2	2.4	28.4
	1909	500,343,985	329,652,618	20,786,673	149,904,704	65.9	4.2	30.0
Ohio:								
Number of establishments.....	1919	86	24	16	46	27.9	18.6	53.5
	1914	70	16	14	40	22.9	20.0	57.1
	1909	75	13	13	49	17.3	17.3	65.3
Value of products.....	1919	\$626,370,025	\$402,707,332	\$19,668,044	\$203,994,640	64.3	3.1	32.6
	1914	205,023,301	122,970,850	6,096,171	75,955,370	60.0	2.9	37.1
	1909	197,780,043	100,239,521	5,117,556	92,422,906	50.7	2.6	46.7
Illinois:								
Number of establishments.....	1919	32	10	9	13	31.3	28.1	40.6
Value of products.....	1919	\$173,344,650	\$124,235,803	\$22,795,126	\$20,313,721	71.7	13.1	15.2
New York:								
Number of establishments.....	1919	30	13	5	12	43.3	16.7	40.0
Value of products.....	1919	\$100,592,636	\$78,059,822	\$10,411,562	\$12,121,252	77.6	10.4	12.0
All other states:								
Number of establishments.....	1919	154	42	40	66	27.3	29.9	42.8
	1914	179	40	55	84	22.4	30.7	46.9
	1909	182	32	53	97	17.6	29.1	53.3
Value of products.....	1919	\$632,182,995	\$389,265,540	\$47,311,098	\$195,606,357	61.6	7.5	30.9
	1914	265,534,850	160,611,447	23,170,365	81,753,038	60.5	8.7	30.8
	1909	287,598,496	177,143,999	19,972,339	90,482,158	61.6	6.9	31.5

TABLE 36.—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
		Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.
United States.....	500	375,088	100.0	.....	\$2,828,902	100.0	.....	\$1,148,827	100.0	.....
Pennsylvania.....	198	171,715	45.8	1	1,296,412	45.8	1	618,939	45.2	1
Ohio.....	86	73,025	19.5	2	626,370	22.1	2	245,810	21.4	2
Indiana.....	23	22,362	5.9	3	199,273	7.1	3	86,079	7.5	3
Illinois.....	32	20,177	5.4	4	173,345	6.1	4	73,025	6.3	4
New York.....	30	17,901	4.8	5	100,593	3.6	5	45,776	4.0	5
West Virginia.....	20	11,630	3.1	7	85,036	3.0	6	34,242	3.0	7
New Jersey.....	16	13,811	3.7	6	74,882	2.6	7	40,055	3.5	6
Alabama.....	9	8,121	2.2	8	64,980	2.3	8	15,646	1.4	8
Massachusetts.....	11	3,684	1.0	11	30,970	1.1	9	11,733	1.0	10
Wisconsin.....	12	3,929	1.0	10	28,393	1.0	10	14,047	1.2	9
Maryland.....	5	4,944	1.3	9	19,884	0.7	11	4,864	0.4	17
Kentucky.....	5	1,892	0.5	16	18,319	0.7	12	5,805	0.5	14
California.....	8	3,476	0.9	12	18,192	0.6	13	8,083	0.7	11
Missouri.....	5	2,647	0.7	14	12,537	0.4	15	8,876	0.8	12
Connecticut.....	7	2,468	0.6	15	9,583	0.3	17	5,341	0.5	16
Michigan.....	7	1,455	0.4	17	8,345	0.3	18	5,443	0.5	15
Delaware.....	6	1,009	0.3	21	7,115	0.3	19	3,253	0.3	19
All other states.....	20	10,842	2.9	.....	55,173	2.0	.....	23,410	2.0	.....

## MANUFACTURES.

TABLE 37.—PERSONS ENGAGED IN THE INDUSTRY: 1919, 1914, AND 1909.

CLASS.	Cen- sus year.	Total.	Male.	Fe- male.	PER CENT OF TOTAL.		CLASS.	Cen- sus year.	Total.	Male.	Fe- male.	PER CENT OF TOTAL.	
					Male.	Fe- male.						Male.	Fe- male.
All classes .....	1919	421,861	409,581	12,280	97.1	2.9	Clerks and other subordinate sal- aried employees.	1919	37,067	28,304	8,763	76.4	23.6
	1914	274,162	270,720	3,442	98.7	1.3		1914	20,919	18,466	2,453	88.3	11.7
	1909	260,762	257,962	2,800	98.9	1.1		1909	16,400	14,613	1,787	89.1	10.9
Proprietors and officials .....	1919	9,703	9,673	33	99.7	0.3	Wage earners (average number) ..	1919	375,088	371,604	3,484	99.1	0.9
	1914	4,527	4,517	10	99.8	0.2		1914	248,716	247,737	979	99.6	0.4
	1909	4,285	4,278	8	99.8	0.2		1909	240,076	239,071	1,005	99.6	0.4
Proprietors and firm members.	1919	35	29	6	82.9	17.1	16 years of age and over .....	1919	374,916	371,444	3,472	99.1	0.9
	1914	52	45	7	86.5	13.5		1914	247,991	247,048	943	99.6	0.4
	1909	47	43	4	91.5	8.5		1909	238,937	237,996	941	99.6	0.4
Salaried officers of corporations.	1919	1,150	1,145	5	99.6	0.4	Under 16 years of age .....	1919	172	160	12	93.6	6.4
	1914	763	764	2	99.7	0.3		1914	725	689	36	95.0	5.0
	1909	779	779	.....	100.0	.....		1909	1,139	1,075	64	94.4	5.6
Superintendents and managers	1919	8,521	8,490	22	99.7	0.3							
	1914	3,769	3,708	1	100.0	(1)							
	1909	3,490	3,466	4	99.9	0.1							

¹ Less than one-tenth of 1 per cent.

TABLE 38.—WAGE EARNERS, BY MONTHS, FOR STATES: 1919.

[The month of maximum employment is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Aver- age num- ber em- ployed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent mini- mum is of maxi- mum.
		Janu- ary.	Febru- ary.	March.	April.	May.	June.	July.	August.	Septem- ber.	Octo- ber.	Novem- ber.	Decem- ber.	
United States:														
1919.....	375,088	441,560	416,541	392,803	307,514	354,721	360,584	383,212	387,965	377,275	<i>292,469</i>	343,312	383,100	66.2
Males.....	371,604	437,472	412,096	389,192	304,164	351,398	357,286	379,815	384,516	373,960	<i>289,463</i>	339,822	379,409	66.2
Females.....	3,484	4,088	3,345	3,611	3,350	3,323	3,298	3,397	3,449	3,315	<i>3,011</i>	3,490	3,691	73.7
1914.....	248,716	257,651	262,418	271,531	270,941	254,443	254,827	252,680	247,953	249,635	233,338	<i>210,279</i>	218,896	77.4
1909.....	240,076	216,349	215,650	<i>216,076</i>	217,307	218,424	235,533	234,151	242,077	253,925	269,255	274,525	283,629	75.8
Alabama.....	8,121	8,505	8,400	8,249	8,555	8,021	<i>7,720</i>	8,067	8,144	7,845	7,745	8,052	8,050	89.8
California.....	3,478	3,506	3,450	3,430	3,317	3,439	3,309	3,370	3,538	3,431	3,740	3,548	3,592	88.3
Connecticut.....	2,468	2,824	2,583	2,555	2,403	2,187	2,265	2,315	2,182	2,351	2,503	2,703	2,712	77.3
Delaware.....	1,009	1,746	1,478	1,025	725	763	664	634	835	975	1,075	993	1,000	32.3
Illinois.....	20,177	25,039	25,795	23,613	21,561	20,059	18,510	18,669	19,452	20,302	<i>15,330</i>	18,274	17,520	51.7
Indiana.....	22,362	28,083	24,363	23,943	21,464	21,195	21,891	23,284	22,622	22,020	<i>16,689</i>	21,937	23,403	64.0
Kentucky.....	1,892	2,633	2,539	2,335	2,040	2,100	2,000	1,862	863	<i>892</i>	1,038	2,171	2,662	32.4
Maryland.....	4,944	5,584	5,725	6,253	4,283	<i>4,021</i>	4,236	4,786	4,813	4,893	5,225	5,266	5,243	70.2
Massachusetts.....	3,684	3,825	3,599	3,385	3,221	3,390	3,407	3,673	3,786	3,940	3,991	3,962	4,629	79.9
Michigan.....	1,455	1,628	1,578	1,342	1,305	<i>1,110</i>	1,214	1,467	1,404	1,526	1,640	1,675	1,472	66.3
Missouri.....	2,647	3,250	3,253	3,213	2,531	2,459	2,447	2,227	2,605	2,581	2,536	<i>2,176</i>	2,486	66.9
New Jersey.....	13,811	14,473	14,316	14,153	13,645	13,492	13,658	<i>13,351</i>	13,427	13,638	13,838	13,884	13,807	92.2
New York.....	17,901	22,502	18,291	17,897	17,722	16,710	17,217	18,291	18,696	18,499	<i>13,391</i>	16,287	19,309	59.5
Ohio.....	73,025	85,394	80,123	75,342	69,910	70,438	72,505	80,007	81,136	80,241	<i>41,747</i>	60,712	78,745	48.9
Pennsylvania.....	171,715	202,630	190,815	177,548	166,937	159,332	183,373	174,004	176,471	169,885	<i>146,252</i>	160,270	174,068	71.7
West Virginia.....	11,630	12,794	12,824	12,603	12,549	11,043	11,570	12,084	12,871	13,210	<i>7,320</i>	8,884	11,199	60.0
Wisconsin.....	3,929	4,794	4,274	4,286	3,634	3,381	3,391	3,500	3,704	3,797	3,541	4,308	4,448	70.7

# STEEL WORKS AND ROLLING MILLS.

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TABLE 39.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR SELECTED STATES: 1919, 1914, AND 1909.

STATE.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—							STATE.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—						
		44 and under.	Between 44 and 48.	48.1	Between 48 and 54.	54.	Between 54 and 60.	60.			44 and under.	Between 44 and 48.	48.1	Between 48 and 54.	54.	Between 54 and 60.	60.
United States:									Michigan:								
1919.....	375,088	56,069	8,522	51,552	12,248	13,704	71,876	82,322	1919.....	1,455			364	325	684	82	
1914.....	218,710	(*)	(*)	19,972	19,084	25,565	45,998	77,820	1914.....	718				121	79	457	61
1909.....	210,070	(*)	(*)	18,283	4,091	23,982	29,022	82,130	Missouri:								
Alabama:									1919.....	2,647			1,319	655	673		
1919.....	8,121					203	1,542	4,091	1914.....	1,237	(*)	(*)	339	259	639		
California:									New Jersey:								
1919.....	3,476	826		1,223		450	977		1919.....	13,811				962	3,329	9,380	81
1914.....	1,244	(*)	(*)	435	178	444	4	183	1914.....	4,639			1,842	679	1,067	1,151	69
Connecticut:									New York:								
1919.....	2,468			1,360	130	61	917		1919.....	17,901	761	647	192	331	2,201	3,845	4,094
Delaware:									1914.....	10,788				331	2,201	3,845	5,830
1919.....	1,009				205		270		Ohio:								
1914.....	818	(*)	(*)	337	242		239		1919.....	73,025	8,343		8,058	1,204	567	16,690	24,170
Illinois:									1914.....	46,307	(*)	(*)	3,303	2,013	2,961	8,094	20,551
1919.....	20,177	501	401	5,359	578	478	2,730	798	Pennsylvania:								
1914.....	15,408	(*)	(*)	1,469	2,003	639	94	2,656	1919.....	171,715	30,427	6,978	25,290	5,256	3,207	29,628	39,429
Indiana:									1914.....	131,955	(*)	(*)	6,521	11,902	14,545	26,948	84,721
1919.....	22,362	4,055		4,685	641	161	1,234	3,141	West Virginia:								
1914.....	11,106	(*)	(*)	2,900	151	1,962	1,584	4,509	1919.....	11,630	4,997		2,276	1,269		240	1,539
Kentucky:									1914.....	5,348	(*)	(*)	2,123	51	962	740	635
1919.....	1,892			603		106	603	260	Wisconsin:								
1914.....	1,937			1,130		158	301	392	1919.....	3,929		72		433	150	2,253	1,021
Maryland:									1914.....	2,029	(*)	(*)	89	171	32	925	812
Massachusetts:																	
1919.....	4,944	3,896	34				283	731									
1914.....	3,084	(*)	(*)	417	340	30	89	417									
1909.....	2,889	(*)	(*)	15	55	267	368	2,194									

\* Includes 48 and under for 1914 and 1909.

† Corresponding figures not available.

TABLE 40.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR STATES: 1919.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—															
	Estab-lish-ments.	Wage earners (average number).	1 to 5 wage earners, inclusive.		6 to 20 wage earners, inclusive.		21 to 50 wage earners, inclusive.		51 to 100 wage earners, inclusive.		101 to 250 wage earners, inclusive.		251 to 500 wage earners, inclusive.		501 to 1,000 wage earners, inclusive.		Over 1,000 wage earners.	
			Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.
United States:																		
1919.....	500	375,088	5	20	13	170	32	1,133	48	3,066	97	16,763	103	33,269	102	72,797	100	242,270
1914.....	427	248,710	3	8	16	196	30	1,119	46	3,629	92	15,414	94	33,921	87	61,185	59	133,244
Alabama.....	9	8,121					1	40			3	494	2	750	1	982	3	5,695
California.....	8	3,476					2	68	2	147	1	196	3	1,214	3	2,026		
Connecticut.....	7	2,468					1	40	1	80	3	123	1	444	1	893	1	1,237
Delaware.....	6	1,009							3	272	9	445	8	3,035	5	3,439	5	11,690
Illinois.....	32	20,177			1	14	1	36	3		9	1,641						
Indiana.....	23	22,362							1	83	7	1,137	3	1,255	7	5,093	5	14,794
Kentucky.....	5	1,892									2	426	1	200	2	1,206		
Maryland.....	5	4,944					1	34	1	85	2		1	283	1	646	1	3,896
Massachusetts.....	11	3,684			3	20	2	60	1	89	2	417	2	704			1	2,376
Michigan.....	7	1,455					1	38	1	82	2	364	3	971				
Missouri.....	5	2,647									1	132	1	375	3	2,140		
New Jersey.....	16	13,811					1	30	4	316	7	182	3	943	4	2,200	3	10,140
New York.....	30	17,901			1	15	2	77	5	400		1,394	5	1,999	3	2,017	7	11,999
Ohio.....	86	73,025	1	1	2	50	4	167	3	196	14	2,480	17	6,125	27	20,075	18	43,951
Pennsylvania.....	193	171,715	4	19	4	30	11	345	19	1,351	31	5,073	46	17,671	35	24,670	48	122,538
West Virginia.....	20	11,630					1	89	2	155	4	675	5	1,046	5	3,748	3	5,867
Wisconsin.....	12	3,929					3	117	1	73	4	683	1	251	2	1,617	1	1,188

## MANUFACTURES.

TABLE 41.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919, 1914, AND 1909.

VALUE OF PRODUCT.	NUMBER OF ESTABLISHMENTS.			AVERAGE NUMBER OF WAGE EARNERS. <sup>1</sup>		VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE. <sup>1</sup>	
	1919	1914	1909	1919	1914	1919	1914	1909	1919	1914
All classes.....	500	427	446	375,088	248,716	\$2,828,902,376	\$918,664,565	\$985,722,534	\$1,148,326,618	\$327,838,873
Less than \$20,000.....	7	9	15	40	58	82,829	79,697	195,454	30,982	37,827
\$20,000 to \$100,000.....	15	34	44	288	1,227	964,125	1,898,617	2,643,474	460,404	972,646
\$100,000 to \$500,000.....	83	131	201	6,289	39,352	25,599,733	38,923,246	86,119,267	12,879,881	38,090,401
\$500,000 to \$1,000,000.....	65	63	180	11,092	208,079	47,864,830	46,953,978	896,764,339	23,723,404	288,728,999
\$1,000,000 and over.....	330	190	180	357,379	208,079	2,754,390,859	831,809,027		1,111,281,907	
PER CENT DISTRIBUTION.										
All classes.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than \$20,000.....	1.4	2.1	3.3	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
\$20,000 to \$100,000.....	3.0	8.0	9.9	0.1	0.5	( <sup>2</sup> )	0.2	0.3	( <sup>2</sup> )	0.3
\$100,000 to \$500,000.....	16.6	30.6	45.1	1.7	15.8	0.9	4.2	8.7	1.1	11.6
\$500,000 to \$1,000,000.....	18.0	14.8	41.7	3.0	83.7	1.7	5.0	91.0	2.1	88.1
\$1,000,000 and over.....	65.0	44.5	41.7	95.2	83.7	97.4	90.5		96.8	

<sup>1</sup> Figures for 1909 not available.<sup>2</sup> Less than one-tenth of 1 per cent.

TABLE 42.—CHARACTER OF OWNERSHIP: 1919, 1914, AND 1909.

	Cen- sus year.	Total.	Corporations.	All others. <sup>1</sup>	PER CENT OF TOTAL.			Cen- sus year.	Total.	Corporations.	All others.	PER CENT OF TOTAL.	
					Cor- pora- tions.	All others.						Cor- pora- tions.	All others.
Number of establish- ments.	1919	500	481	19	96.2	3.8	Value of products....	1919	\$2,828,902,376	\$2,820,937,006	\$7,964,380	99.7	0.3
	1914	427	407	20	95.3	4.7		1914	813,664,565	914,199,638	4,464,927	99.5	0.5
	1909	446	424	22	95.1	4.9		1909	985,722,534	980,546,617	5,175,917	99.5	0.5
Average number of wage earners.	1919	375,088	373,442	1,646	99.6	0.4							
	1914	248,716	246,020	2,696	98.9	1.1							
	1909	240,076	237,684	2,392	99.0	1.0							

<sup>1</sup> Includes 10 establishments owned by individuals in 1919 and 8 each in 1914 and in 1909; balance chiefly firms.

TABLE 43.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919, 1914, AND 1909.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.					
	1919	1914	1909	Amount.			Per cent distribution.		
				1919	1914	1909	1919	1914	1909
Primary power, total.....	27,645	11,227	8,244	3,820,917	2,706,553	2,100,978	100.0	100.0	100.0
Owned.....	5,592	5,328	6,033	3,123,070	2,521,392	2,042,066	81.7	93.2	97.2
Steam.....	5,418	5,121	5,865	2,850,556	2,435,819	1,956,846	74.7	90.0	93.1
Engines.....	4,739	4,121	5,865	2,245,846	2,435,819	1,956,846	58.7	90.0	93.1
Turbines.....	670			610,710			16.0		
Internal-combustion engines.....	141	123	118	257,473	73,752	79,391	6.8	2.7	3.8
Water wheels, turbines, and motors.....	33	84	50	9,041	12,321	6,829	0.2	0.5	0.3
Rented.....	22,053	5,899	2,211	697,847	185,161	58,912	18.2	6.8	2.8
Electric.....	22,053	5,899	2,211	695,097	182,204	58,797	18.2	6.7	2.8
Other.....				2,750	2,957	115	(*)	0.1	(*)
Electric.....	85,480	45,896	27,769	2,350,596	1,207,715	716,609	100.0	100.0	100.0
Rented.....	22,053	5,899	2,211	695,097	182,204	58,797	29.6	15.1	8.2
Generated by establishments reporting.....	63,427	39,997	25,558	1,655,499	1,025,511	657,812	70.4	84.9	91.8

<sup>1</sup> Figures for horsepower include for 1909 the amount reported under the head of "Other" owned power.<sup>2</sup> Includes turbines.<sup>3</sup> Less than one-tenth of 1 per cent.

# STEEL WORKS AND ROLLING MILLS.

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TABLE 44.—FUEL CONSUMED, BY STATES: 1919 AND 1914.

STATE.	COAL.		Coke (tons, 2,000 pounds).	Fuel oils (barrels).	Gasoline and other volatile oils (bar- rels).	Gas (1,000 cu- bic feet).	STATE.	COAL.		Coke (tons, 2,000 pounds).	Fuel oils (barrels).	Gasoline and other volatile oils (bar- rels).	Gas (1,000 cu- bic feet).
	Anthra- cite <sup>1</sup> (tons, 2,240 pounds).	Bitumi- nous (tons, 2,000 pounds).						Anthra- cite <sup>1</sup> (tons, 2,240 pounds).	Bitumi- nous (tons, 2,000 pounds).				
United States:							Michigan:						
1919.....	598,944	25,911,098	886,062	8,191,143	299,840	90,678,288	1919.....		30,481	6,038	32,208	1,095	1,022
1914.....	558,723	20,343,767	495,214	3,011,192	(*)	81,310,122	1914.....		22,173	2,036	23,404	(*)	4,606
Alabama:							Missouri:						
1919.....	77	907,485	85,477	81,294	.....	174,500	1919.....		76,080	2,651	138,348	.....	528
California:							1914.....		48,135	1,836	95,976	(*)	.....
1919.....			3,151	454,206	68,688	369,483	New Jersey:						
1914.....		118	3,911	191,691	(*)	.....	1919.....	35,034	392,085	3,357	430,771	293	1,800
Connecticut:							1914.....	39,031	234,186	3,373	183,580	(*)	2,173
1919.....	43,544	67,281	11,244	12,115	147	2,020	New York:						
Delaware:							1919.....	4,306	1,074,618	34,870	149,178	4,731	85,481
1919.....	538	104,389	3,194	15,454	217	1	1914.....	6,806	790,937	29,703	78,570	(*)	31,471
1914.....	2,734	29,047	3,125	2,941	(*)	29	Ohio:						
Illinois:							1919.....	1,175	5,096,601	284,874	565,975	9,854	15,294,674
1919.....	1,103	1,792,476	33,325	575,473	30,450	452,948	1914.....	574	4,209,990	134,533	132,124	(*)	12,007,011
1914.....	583	1,670,382	40,908	848,078	(*)	962	Pennsylvania:						
Indiana:							1919.....	509,568	12,571,538	319,198	3,674,868	181,394	68,025,366
1919.....	475	1,753,150	17,603	787,205	921	28,634	1914.....	476,046	10,335,061	162,024	1,006,833	(*)	63,406,100
1914.....	4	1,211,399	13,654	162,716	(*)	32,778	West Virginia:						
Kentucky:							1919.....		727,378	22,614	12,852	296	2,168,761
1919.....		148,837	7,790	.....	.....	1,880,827	1914.....		405,324	16,454	.....	.....	2,803,410
1914.....		160,830	11,128	.....	.....	1,557,449	Wisconsin:						
Maryland:							1919.....	144	170,410	6,513	72,585	290	17,923
1919.....							1914.....		66,701	3,110	10,869	(*)	4,977
Massachusetts:							All other states:						
1919.....	157	107,625	3,713	529,811	250	835,590	1919.....	791	680,555	39,213	380,290	848	1,249,904
1914.....	722	125,184	1,088	65,648	(*)	7,430	1914.....	81,623	1,034,300	67,451	208,762	(*)	1,591,827

<sup>1</sup>Includes some semianthracite.

\* Included in figures for fuel oils.

## SPECIAL STATISTICS.

**Materials.**—Table 45 gives the statistics for the principal materials used in the industry for the census years 1919, 1914, 1909, and 1904, distributed in the main as between those produced by the consuming establishment and purchased materials. The former carry assigned values. The cost of all rolled forms not specifically listed is included in the item "All other materials." Detailed statistics, by states, will be found in Table 65.

The figures in Table 45 show an increase of 39.8 per cent in pig-iron consumption for the period 1914–1919, with a decrease of 8.6 per cent for the period 1909–1914 and an increase of 56.4 per cent for 1904–1909.

The expense for fuel and rent of power constituted 9.3 per cent of the total cost for materials in 1919 and 1914.

## MANUFACTURES.

TABLE 45.—MATERIALS: 1919, 1914, 1909, AND 1904.  
(Ton, 2,240 pounds.)

MATERIAL.	1919	1914	1909	1904
Total cost.....	\$1,680,575,758	\$590,825,692	\$657,500,856	\$441,204,432
Iron and steel, for furnaces and hot rolls:				
Pig iron, including ferroalloys—				
Tons.....	24,362,942	17,429,657	19,076,889	12,191,228
Cost.....	\$655,002,125	\$248,630,953	\$297,471,122	\$172,101,436
Pig iron—				
Produced by consumer—				
Tons.....	21,170,136	15,111,458	15,108,244	( <sup>1</sup> )
Assigned cost.....	\$496,313,109	\$201,965,395	\$224,474,026	( <sup>1</sup> )
Purchased—				
Tons.....	2,749,822	2,016,634	3,604,060	( <sup>1</sup> )
Cost.....	\$85,204,226	\$30,166,377	\$58,189,714	( <sup>1</sup> )
Spiegeleisen and ferro-manganese—				
Produced by consumer—				
Tons.....	123,353	103,238	144,492	( <sup>1</sup> )
Cost.....	\$13,772,841	\$3,849,738	\$3,776,793	( <sup>1</sup> )
Purchased—				
Tons.....	223,742	163,327	220,093	( <sup>1</sup> )
Cost.....	\$27,706,690	\$12,649,448	\$11,030,584	( <sup>1</sup> )
Other ferroalloys—				
Produced by consumer—				
Tons.....	7,215	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>1</sup> )
Cost.....	\$1,292,822	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>1</sup> )
Purchased—				
Tons.....	88,674	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>1</sup> )
Cost.....	\$30,712,537	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Scrap iron or steel, including old rails not intended for re-rolling—				
Total consumption, tons.....	16,369,210	10,656,187	9,929,710	.....
Produced by consumer in other works—				
Tons.....	1,430,200	899,113	773,843	.....
Assigned cost.....	\$28,154,391	\$11,384,960	\$10,620,317	5,124,277
Purchased—				\$867,001,243
Tons.....	5,545,822	4,171,767	4,029,774	.....
Cost.....	\$116,978,660	\$47,996,567	\$62,093,514	.....
Made and consumed in same works, tons.....	9,343,128	5,585,307	5,129,093	( <sup>1</sup> )
Rails for re-rolling—				
Tons.....	185,459	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
Cost.....	\$4,154,381	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
Steel, crude and semifinished (ingots, blooms, billets, slabs, and sheet and tin-plate bars)—				
Produced by consumer in other works—				
Tons.....	4,401,127	2,882,069	3,080,672	.....
Assigned cost.....	\$173,067,624	\$57,587,159	\$62,504,558	4,920,177
Purchased—				\$110,208,823
Tons.....	4,545,100	3,576,330	3,427,577	.....
Cost.....	\$194,994,191	\$74,590,904	\$82,981,077	.....
Iron ore—				
Tons.....	1,051,791	999,472	835,335	549,995
Domestic.....	1,044,907	999,617	823,306	546,262
Foreign.....	6,884	29,855	12,032	3,733
Cost.....	\$8,480,622	\$4,252,201	\$4,292,963	\$2,396,792
Crude—				
Tons.....	1,014,989	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )
Cost.....	\$7,185,688	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )
Manganiferous—				
Tons.....	17,709	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )
Cost.....	\$234,619	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )
Chrome—				
Tons.....	19,093	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )
Cost.....	\$1,060,345	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )
Iron and steel, rolled forms for further manufacture:				
Iron muck and scrap bar—				
Total consumption, tons.....	968,512	( <sup>1</sup> )	( <sup>1</sup> )	.....
Produced by consumer in other works—				
Tons.....	106,800	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
Assigned cost.....	\$6,589,466	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>1</sup> )
Purchased—				
Tons.....	128,203	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>1</sup> )
Cost.....	\$7,586,489	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>1</sup> )
Made and consumed in same works, tons.....	733,509	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )
Iron and steel skelp—				
Total consumption, tons.....	2,425,845	1,376,313	1,578,290	.....
Produced by consumer in other works—				
Tons.....	322,082	47,998	35,221	.....
Assigned cost.....	\$10,297,117	\$1,662,917	\$1,161,430	259,643
Purchased—				\$7,831,935
Tons.....	437,764	144,559	141,496	.....
Cost.....	\$27,314,278	\$3,833,933	\$4,553,426	.....
Made and consumed in same works, tons.....	1,605,990	1,183,759	1,401,573	( <sup>1</sup> )
Iron and steel wire rods—				
Total consumption, tons.....	1,375,949	1,494,761	1,465,221	.....
Produced by consumer in other works—				
Tons.....	5,794	76,717	128,291	.....
Assigned cost.....	\$620,597	\$1,864,312	\$3,547,577	161,914
Purchased—				\$4,774,383
Tons.....	15,528	18,978	18,184	.....
Cost.....	\$1,327,725	\$487,715	\$705,118	.....
Made and consumed in same works, tons.....	1,354,627	1,399,066	1,318,796	( <sup>1</sup> )

<sup>1</sup> Figures not available.<sup>2</sup> Included with spiegeleisen and ferromanganese.<sup>3</sup> Included with steel, crude and semifinished, etc.

TABLE 45.—MATERIALS: 1919, 1914, 1909, AND 1904—Continued.

MATERIAL.	1919	1914	1909	1904
Iron and steel, rolled forms for further manufacture—Con. Copperingots, billets, blooms, bars, and rods—				
Total consumption, tons.....	72,366			
Produced by consumer in other works—				
Tons.....	12,040			
Assigned cost.....	\$402,305			
Purchased—		13,335	19,545	( <sup>1</sup> )
Tons.....	31,318	\$4,069,309	\$5,756,018	( <sup>1</sup> )
Cost.....	\$12,980,464			
Made and consumed in same works, tons.....	29,008			
Copper scrap—				
Tons.....	1,714			
Cost.....	\$524,252			
Zinc (spelter)—				
Tons.....	80,380	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Cost.....	\$12,283,608	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Fuel and rent of power, cost.....	\$156,964,862	\$55,447,804	\$46,136,725	\$35,386,666
All other materials, cost.....	\$253,852,602	\$79,016,953	\$75,588,011	\$41,343,144

<sup>1</sup> Figures not available.<sup>2</sup> Included with "All other materials."

Pig-iron consumption.—Table 46 presents the figures for the consumption of pig iron and ferroalloys in 1919, 1914, and 1909, and the figures for Ohio and Pennsylvania, the leading states, these states consuming more than two-thirds of the total.

TABLE 46.—PIG IRON AND FERROALLOYS—CONSUMPTION: 1919, 1914, AND 1909.  
(Ton, 2,240 pounds.)

	Cen- sus year.	Total.	Produced by com- panies consum- ing.	Pur- chased.	PER CENT OF TOTAL.	
					Pro- duced.	Pur- chased.
United States:						
Total.....	1919	24,362,942	21,300,704	3,062,238	87.4	12.6
	1914	17,429,657	15,219,096	2,209,961	87.3	12.7
	1909	19,076,889	15,252,736	3,824,153	80.0	20.0
Pig iron.....	1919	23,919,958	21,170,136	2,749,822	88.5	11.5
	1914	17,128,092	15,111,458	2,016,634	88.2	11.8
	1909	18,712,304	15,108,244	3,604,060	80.7	19.3
Ferroalloys (spiegeleisen, ferromanganese, etc.).	1919	442,984	130,568	312,416	29.5	70.5
	1914	301,565	108,238	193,327	35.9	64.1
	1909	364,585	144,492	220,093	39.6	60.4
Ohio:						
Pig iron.....	1919	5,784,072	5,171,519	612,553	89.4	10.6
	1914	4,341,857	3,951,843	390,014	91.0	9.0
	1909	4,172,114	3,172,453	999,661	76.0	24.0
Ferroalloys.....	1919	100,927	18,964	81,963	18.8	81.2
	1914	46,166	10,306	35,860	22.3	77.7
	1909	37,035	10,462	26,573	28.2	71.8
Pennsylvania:						
Pig iron.....	1919	10,325,070	9,136,962	1,188,108	88.5	11.5
	1914	8,262,049	7,230,146	1,031,903	87.5	12.5
	1909	9,168,200	7,197,182	1,961,078	78.6	21.4
Ferroalloys.....	1919	200,731	70,705	130,026	35.2	64.8
	1914	138,132	46,560	91,572	33.7	66.3
	1909	159,643	77,719	81,924	48.7	51.3
All other states:						
Pig iron.....	1919	7,810,816	6,861,655	949,161	87.8	12.2
	1914	4,524,186	3,929,469	594,717	86.9	13.1
	1909	5,381,930	4,738,609	643,321	88.0	12.0
Ferroalloys.....	1919	141,326	40,899	100,427	28.9	71.1
	1914	117,267	51,372	65,895	43.8	56.2
	1909	167,907	56,311	111,596	33.5	66.5

Products.—Table 47 is a comparative summary of the leading classes of products for the census years 1904 to 1919, inclusive. The table carries data for the number of establishments reporting quantities and values for each class, with the quantity and value of each produced for sale, and the quantity and assigned value for products made for consumption by the same establishment in further processes of manufacture. This information is given with as much detail as the records permit.

For convenience the products are divided into four groups, namely: Group I, rolled, forged, and other classified steel and iron products, with subdivisions (A) for finished rolled products and forgings; (B) semi-finished rolled products; and (C) unrolled steel. The other groups of the table comprise Group II, scrap; Group III, other iron and steel products; and Group IV, products other than iron and steel. The aggregate value of the products of these four groups, which represents the total products of the establishments constituting the industry, was \$2,828,902,376 in 1919, an increase of \$1,910,237,811, or over 200 per cent, over that of 1914. Group III carries the added value accruing from remanufactures from rolled products, such as pipes and tubes, wire and wire products, spikes, bolts, rivets, etc., detailed statistics of which are given in Table 53, including the total value of these products.

TABLE 47.—PRODUCTS: 1919, 1914, 1909, AND 1904.

(Ton, 2,240 pounds.)

PRODUCT.	1919	1914	1909	1904
Total value <sup>1</sup> .....	\$2,828,902,376	\$918,664,595	\$985,722,534	\$673,985,026
I. Rolled, forged, and other classified steel and iron products:				
Tons.....	38,211,947	25,622,784	20,723,274	18,218,233
For sale.....	23,114,711	16,904,966	18,285,891	18,218,233
For consumption.....	13,097,236	8,617,818	8,437,383	—
Value.....	\$2,417,012,540	\$800,278,038	\$863,342,711	\$585,288,243
A.—Finished rolled products and forgings—				
Tons.....	25,512,847	18,482,182	19,276,237	12,759,993
For sale.....	17,343,747	12,647,638	14,024,550	—
For consumption.....	8,169,100	5,834,544	5,251,687	—
Value.....	\$1,859,457,051	\$623,486,963	\$667,393,177	\$447,180,095
Rails—				
Number of establishments.....	16	15	13	14
Tons.....	2,088,838	1,842,041	2,858,599	2,194,605
Value.....	\$92,849,481	\$54,009,918	\$81,128,295	\$58,256,750
Open-hearth—				
Tons.....	1,893,141	1,552,684	1,215,072	128,681
Value.....	\$82,644,046	\$45,336,381	\$36,400,780	\$3,608,562
Bessemer—				
Tons.....	195,067	319,857	1,643,527	2,085,024
Value.....	\$10,204,835	\$8,673,537	\$44,727,515	\$54,627,488
Rerolled or renewed rails—				
Number of establishments.....	6	8	9	8
Tons.....	95,637	63,671	106,352	90,530
Value.....	\$4,788,888	\$1,438,237	\$2,083,017	\$2,480,328
Rail joints, fastenings, etc.—				
Number of establishments.....	24	26	25	—
Tons.....	482,691	349,807	396,911	174,055
Value.....	\$27,595,921	\$11,626,956	\$14,488,412	\$5,663,052
Structural shapes—				
Number of establishments.....	30	35	27	—
Tons.....	2,526,461	2,083,440	2,123,630	954,537
Value.....	\$151,970,084	\$57,476,866	\$65,504,593	\$32,730,901
Bars for reinforced concrete—				
Number of establishments.....	34	30	25	—
Tons.....	301,453	269,666	191,358	—
Value.....	\$18,428,795	\$7,751,549	\$5,588,968	—
Merchant bars, mill shafting, etc.—				
Number of establishments.....	140	99	—	—
Tons.....	4,026,448	2,062,791	—	2,442,810
Value.....	\$326,764,280	\$71,352,896	—	\$84,089,122
Iron—				
Tons.....	458,549	411,040	132	—
Value.....	\$33,796,197	\$13,057,104	3,784,248	—
Bolt and nut rods, spikes and chain rods, horseshoe nail rods, etc.—				
Number of establishments.....	29	41	—	—
Tons.....	232,020	535,875	—	—
Value.....	\$15,333,748	\$18,319,865	—	—

<sup>1</sup> In addition, steel castings and rolled steel valued at \$7,143,128 were produced by 7 establishments in 1919; to the value of \$2,831,984 by 13 establishments in 1914; to the value of \$8,627,639 by 29 establishments in 1909; and to the value of \$347,264 in 1904 by establishments not classified as steel works and rolling mills.

<sup>2</sup> Includes 77,598 tons of alloy steel rails in 1919, and 27,286 tons in 1914.

TABLE 47.—PRODUCTS: 1919, 1914, 1909, AND 1904—Continued.

PRODUCT.	1919	1914	1909	1904
I. Rolled, forged, and other classified steel and iron products—Continued.				
A.—Finished rolled products and forgings—Con.				
Wire rods—				
Number of establishments.....	33	33	29	—
Tons.....	2,484,428	2,377,091	2,295,279	1,792,704
Value.....	\$120,738,142	\$81,578,145	\$81,947,958	\$52,995,031
For sale—				
Tons.....	582,278	535,098	511,322	(*)
Value.....	\$31,152,583	\$14,000,752	\$14,081,108	—
For consumption, tons.....	1,902,155	1,842,593	1,783,957	—
In works where produced.....	1,354,627	1,399,060	1,318,790	(*)
In other works of same company.....	547,528	443,527	465,161	—
Assigned value.....	\$95,585,559	\$47,577,398	\$47,206,850	—
Steel rods—				
Cold-rolled, cold-drawn, cold-hammered, or polished—				
Number of establishments.....	12	—	(*)	(*)
Tons.....	145,097	(*)	(*)	(*)
Value.....	\$17,082,981	(*)	(*)	(*)
Rolled wire rods in coils or bars, of crucible or electric steel—				
Number of establishments.....	8	—	(*)	(*)
Tons.....	15,359	(*)	(*)	(*)
Value.....	\$4,767,443	(*)	(*)	(*)
Plates or sheets, other than for tinning—				
Number of establishments.....	135	99	105	—
Tons.....	6,720,191	3,899,249	3,332,733	1,856,469
Value.....	\$523,621,423	\$129,785,968	\$138,272,893	\$77,802,001
For sale—				
Tons.....	5,257,975	2,907,272	2,807,114	(*)
Value.....	\$408,680,562	\$98,442,908	\$108,298,861	—
For consumption, tons.....	1,462,216	791,977	525,619	—
Assigned value.....	\$114,930,861	\$38,342,966	\$24,973,532	—
According to gauge—				
No. 12 and thicker—				
Tons.....	4,426,998	2,183,775	2,392,144	(*)
Value.....	\$295,924,025	\$82,768,579	—	—
No. 13 and thinner—				
Tons.....	2,293,193	1,616,474	940,589	(*)
Value.....	\$227,697,398	\$87,017,384	—	—
Black plates (or sheets) for tinning—				
Number of establishments.....	32	30	29	35
Tons.....	1,084,175	1,011,938	631,435	504,025
Value.....	\$94,456,189	\$43,147,041	\$30,955,067	\$25,297,079
For sale—				
Tons.....	7,107	81,583	56,275	(*)
Value.....	\$922,391	\$3,500,576	\$2,786,396	—
For consumption, tons.....	1,077,068	930,355	575,160	—
Assigned value.....	\$93,583,708	\$39,646,495	\$28,219,571	—
Skelp—				
Number of establishments.....	38	38	42	—
Tons.....	2,589,084	1,960,844	2,084,288	1,557,690
Value.....	\$151,557,342	\$52,443,303	\$64,514,728	\$46,730,202
For sale—				
Tons.....	879,271	506,380	580,686	(*)
Value.....	\$21,928,860	\$14,621,830	\$18,415,804	—
For consumption, tons.....	2,206,793	1,454,464	1,503,600	—
In works where produced.....	1,665,999	1,183,756	1,401,573	(*)
In other works of same company.....	543,794	270,708	102,027	—
Assigned value.....	\$129,628,482	\$37,821,473	\$40,099,124	—
Hoops, bands, and cotton ties—				
Number of establishments.....	34	17	15	—
Tons.....	832,212	603,940	341,043	337,281
Value.....	\$69,865,330	\$19,945,078	\$10,429,681	\$12,760,011
For sale—				
Tons.....	750,394	(*)	(*)	(*)
Value.....	\$63,762,389	(*)	(*)	—
For consumption, tons.....	81,818	—	—	—
Assigned value.....	\$5,102,941	—	—	—
Nail and tack plate—				
Number of establishments.....	7	11	12	—
Tons.....	84,579	50,302	68,557	86,60
Value.....	\$2,548,468	\$2,008,308	\$2,540,022	\$2,462,07
For sale—				
Tons.....	18,590	19,751	25,867	(*)
Value.....	\$1,777,168	\$808,852	\$960,482	—
For consumption, tons.....	15,989	30,551	42,690	(*)
Assigned value.....	\$771,319	\$1,204,956	\$1,579,530	—
Axles, rolled or forged—				
Number of establishments.....	7	10	8	—
Tons.....	\$97,813	\$89,436	102,348	\$3,58
Value.....	\$9,752,973	\$3,407,271	\$3,831,344	\$2,875,82

\* Figures not available.

\* Plates "16 gauge and thicker" and sheets "17 gauge and thinner."

\* Includes for 1919, 1,566 tons of axles other than car and locomotive (automobile, carriage, etc.), valued at \$317,774; and for 1914, 1,180 tons valued at \$96,066.



TABLE 47.—PRODUCTS: 1919, 1914, 1909, AND 1904—Continued.

PRODUCT.	1919	1914	1909	1904
I. Rolled, forged, and other classified steel and iron products—Continued.				
A.—Finished rolled products and forgings—Continued.				
Armor plate, gun forgings, and ordnance—				
Number of establishments.....	13	6	5	4
Tons.....	101,130	38,689	28,845	24,433
Value.....	\$55,690,658	\$19,947,893	\$10,649,079	\$10,549,620
Car and locomotive wheels, rolled or forged—				
Tons.....	117,763	(1)	(1)	(1)
Value.....	\$17,044,728			
All other rolled products—				
Tons.....	787,475	619,674	566,627	377,665
Value.....	\$75,686,987	\$37,125,670	\$39,570,061	\$16,743,727
All forged or other iron and steel products, not otherwise enumerated—				
Tons.....	309,965	411,402	385,986	274,061
Value.....	\$38,558,021	\$19,165,900	\$18,740,241	\$15,634,967
B.—Semifinished rolled products (for sale or for transfer to other works of same company)—				
Tons.....	9,205,930	6,408,030	6,799,436	4,974,511
Value.....	\$389,596,293	\$130,674,909	\$153,493,390	\$113,552,102
Blooms, billets, and slabs, steel—				
Tons.....	6,024,044	3,961,873	4,837,796	4,823,585
Value.....	\$249,394,083	\$80,638,672	\$108,514,747	\$109,611,104
For sale—				
Tons.....	2,039,349	1,414,619	1,841,819	(1)
Value.....	\$90,124,414	\$29,706,572	\$43,021,988	(1)
For consumption in other works of producer—				
Tons.....	3,984,695	2,577,254	3,045,977	(1)
Assigned value.....	\$159,269,669	\$50,932,100	\$65,492,759	(1)
Roller blooms, billets, and slabs, for forging purposes—				
Tons.....	188,533	65,939	84,383	(1)
Value.....	\$10,669,833	\$1,695,637	\$2,247,133	(1)
Hammered charcoal blooms, billets, and slabs—				
Tons.....	17,785	(1)	(1)	(1)
Value.....	\$920,704	(1)	(1)	(1)
Sheet and tin-plate bars—				
Tons.....	2,864,578	2,241,735	1,652,761	(1)
Value.....	\$117,855,738	\$45,372,785	\$37,745,209	(1)
For sale—				
Tons.....	2,555,741	2,088,789	1,625,408	(1)
Value.....	\$104,597,932	\$42,308,755	\$37,105,899	(1)
For consumption in other works of producer—				
Tons.....	308,837	152,966	27,353	(1)
Value.....	\$13,257,806	\$3,064,030	\$390,400	(1)
Muck and scrap bar—				
Tons.....	172,960	108,483	174,496	150,926
Value.....	\$10,755,935	\$2,967,815	\$4,986,211	\$3,940,093
For sale—				
Tons.....	62,039	89,379	154,431	(1)
Value.....	\$4,146,009	\$2,379,056	\$4,280,909	(1)
For consumption in other works of producer—				
Tons.....	110,951	19,104	20,065	(1)
Value.....	\$6,609,326	\$588,759	\$696,242	(1)
Made and consumed in same works, tons.				
Blooms, billets, and slabs, steel.....	19,344,106	13,102,896	11,375,622	(1)
Hammered charcoal blooms, billets, and slabs.....	33,602	35,704		
Roller blooms and billets, for forging purposes.....	124,321	98,856	76,614	
Sheet and tinplate bars.....	1,289,851	723,350	441,637	(1)
Muck and scrap bar.....	733,506	958,640	1,191,828	(1)
C.—Unrolled steel (for sale or transfer to other works of same company)				
Tons.....	1,438,170	632,572	647,601	483,729
Value.....	\$167,959,202	\$49,117,166	\$42,456,174	\$24,585,446
Ingots—				
Tons.....	718,027	63,371	142,745	196,404
Value.....	\$33,315,197	\$1,383,408	\$3,593,726	\$3,935,310
For sale—				
Tons.....	219,013	29,421	30,444	(1)
Value.....	\$15,843,848	\$737,382	\$1,513,445	(1)

1 Figures not available.

2 Included above with blooms, billets, and slabs.

TABLE 47.—PRODUCTS: 1919, 1914, 1909, AND 1904—Continued.

PRODUCT.	1919	1914	1909	1904
I. Rolled, forged, and other classified steel and iron products—Continued.				
C.—Unrolled steel—Con.				
Ingots—Continued.				
For consumption in other works of producer—				
Tons.....	484,014	33,950	112,301	(1)
Assigned value.....	\$17,466,849	\$640,086	\$2,080,281	(1)
Direct steel castings—				
Tons.....	720,143	569,201	504,856	287,325
Value.....	\$134,644,005	\$44,733,698	\$38,862,448	\$20,600,136
II. Scrap iron or steel:				
For sale—				
Tons.....	1,340,790	983,216	840,118	
Value.....	\$24,487,435	\$11,060,297	\$12,632,772	
For consumption in other works of producer—				
Tons.....	773,855	492,048	398,436	877,177
Assigned value.....	\$12,926,837	\$4,674,546	\$5,530,852	\$11,079,831
Made and consumed in same works, tons.....	9,343,128	5,595,122	5,126,093	(1)
III. All other steel or iron products, not rolled, including value added to iron and steel rolling-mill products by further manufacture.....	\$345,902,346	\$85,238,964	\$30,534,360	\$61,977,264
IV. All products other than steel or iron.....	\$22,265,923	\$15,103,136	\$16,356,978	
Custom work and repairing.....	\$6,307,289	\$1,709,584	\$1,324,852	\$15,619,668

1 Figures not available.

Finished rolled products and forgings.—Comparative statistics, by states, of the production of finished rolled products and forgings for the census years 1904 to 1919, inclusive, are given in Table 48.

TABLE 48.—FINISHED ROLLED PRODUCTS AND FORGINGS—PRODUCTION, RANKED BY STATES: 1919, 1914, 1909, AND 1904.

[Ton, 2,240 pounds.]

STATE.	1919	1914	1909	1904	PER CENT DISTRIBUTION.			
					1919	1914	1909	1904
United States.....	25,512,847	18,482,182	19,276,237	12,759,993	100.0	100.0	100.0	100.0
Pennsylvania.....	12,143,217	9,374,588	9,908,162	6,923,608	47.6	50.7	51.4	54.3
Ohio.....	4,984,114	3,449,352	3,097,426	1,659,272	19.5	18.7	16.1	13.0
Indiana.....	2,657,267	1,596,951	965,174	407,159	10.4	8.5	5.0	3.2
Illinois.....	1,650,308	1,451,584	2,086,120	1,301,870	6.5	7.9	10.8	10.2
New York.....	936,785	624,773	798,225	533,720	3.7	3.4	4.1	4.2
Alabama.....	689,109	392,969	(1)	(1)	2.7	2.1		
Maryland.....	198,872	(1)	(1)	(1)	0.8			
West Virginia.....	685,529	437,651	437,388	288,793	2.7	2.4	2.3	2.3
Massachusetts.....	187,636	129,162	150,613	143,320	0.7	0.7	0.8	1.1
Wisconsin.....	(1)	107,173	260,226	189,269		0.6	1.3	1.5
New Jersey.....	180,472	119,807	137,679	149,724	0.7	0.6	0.7	1.2
California.....	144,490	60,221	50,931	30,466	0.6	0.3	0.3	0.2
Kentucky.....	80,290	94,830	127,851	143,566	0.3	0.5	0.7	1.1
Missouri.....	89,057	(1)	(1)	(1)	0.3			
Delaware.....	64,148	(1)	(1)	(1)	0.3			
Connecticut.....	47,161	(1)	(1)	(1)	0.2			
Michigan.....	2,077	(1)	(1)	(1)	(1)			
All other states.....	772,315	673,121	1,261,442	989,223	3.0	3.6	6.5	7.7

1 Included in "All other states."

2 Figures not available.

3 Less than one-tenth of 1 per cent.

Number of establishments.—The number of establishments reporting the various classes of products is given in Table 49, distributed by states, in comparison with the same information for 1914.

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TABLE 49.—NUMBER OF ESTABLISHMENTS MANUFACTURING SPECIFIED PRODUCTS: 1919 AND 1914.

STATE.	Total number of establishments.		Ralls.		Re-rolled or re-nuewed rails.		Rail fastenings.		Struc-tural shapes		Merch-ant bars, etc.		Bars for rein-forced con-crete.		Wire rods.		Plates and sheets.		Black plates for tin-ning.		Skelp, flue, and pipe.		Hoops, bands, and cotton ties.		Axles.		Nail and tack plate.		Armor plate, gun forgings, and ord-nance.		Muck and scrap bar.		Steel.		Steel in-gots.		Steel cast-ings.			
	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914				
United States.....	500	427	16	15	6	8	24	26	33	35	147	117	34	29	40	33	135	99	32	32	38	39	34	17	7	10	7	11	13	6	75	96	257	211	161	113	145	129		
Alabama.....	9	6	3	2					2	1	3	3	2	2	2	2	3	1					2	1							1	3	2	2	2	2	2	2		
California.....	8	7					1	1	1	3	8	4	4	2			3														1	3	7	5	4	3	5	2		
Colorado.....	1	1	1	1		1	1	1	1		1	1	1		1	1	1					1	1								1	3	2	2	1	1	1	1		
Connecticut.....	7	4									2	2			2							1								1	1	3	2	2	2	1	3	1		
Delaware.....	6	5															3	1														5	4	2		3	4			
District of Columbia.....	1	1									1	1		1	1	1								1	1					1	1			1	1	1	1			
Georgia.....	1	1																														3	6	19	14	13	8	10	8	
Illinois.....	32	25	1	1			3	2	1	3	8	11	2	2	4	3	2	2	1	1			3	2							5	7	10	7	5	2	2	8	6	
Indiana.....	23	19	1	1			3	3	2	4	9	7	3	4	2	2	7	6	2	1	1				1	1							2		3		1			
Iowa.....	2												1																											
Kentucky.....	6	6									1	1			1	1	2	2												1	1	3	2	3	2					
Maine.....	1	1									1	1	1																		1	1								
Maryland.....	5	3	1	1	1	1					3	2			1	1			2	1									1	1				3	2	3	2			
Massachusetts.....	11	11							1		3	2			1	1							2	1							1		8	8	2	2	7	7		
Michigan.....	7	9									2	2																					5	6	1			4	6	
Minnesota.....	2	1							1		2	1					1	1														2	1	2	1		2	1		
Missouri.....	5	3									1				1																	2	1	2	1			2		
New Jersey.....	16	15					1				8	5	1	4	2		6	5				1	1							1	1	4	4	8	8	6	5	6	4	
New York.....	30	24	1	1			2	2	1	1	18	9	1	2	5	2	6									1	1					4	7	18	13	14	7	5	7	
Ohio.....	86	70	1	1	1	1	3	3	5	4	17	11	6	4	10	6	35	26	0	8	10	9	7	2		1	1	1		5	9	40	30	26	16	21	18			
Oklahoma.....	1	1									1																							1	1			1	1	
Oregon.....	1	1									1	1																						1	1					
Pennsylvania.....	198	178	6	6	2	3	7	11	16	18	68	48	11	8	15	11	62	48	11	14	21	24	16	9	4	7	4	6	9	4	42	47	93	85	63	66	51	46		
Rhode Island.....	3	3									1	1			1	1							2										1	1						
Tennessee.....	1	1									1	1																					1	1						
Texas.....	1	1									1	1																							1	1				
Utah.....	1																																							
Virginia.....	2	2					1	1	1	1	2	2																			1			1	1		1		2	
Washington.....	3	1					1	1	1	1	1	1					2															1	1	3		4	3	3	2	
West Virginia.....	20	15					1	1	1	1	1	1					7	7	7	7	4	3	1		1		1	2				1	1	5	4	4	3	3	2	
Wisconsin.....	12	12	1	1			1	1	1	1	1	1	1	1	1	1							1										10	11	1		9	11		

Disposition of products.—In Table 50 are presented for 1919 the tonnage and value of the finished rolled and forged products of the industry, classified by kinds and whether produced for consumption or for sale, with percentages of distribution. The nature of some

of the products fixes their disposition either for consumption, or for sale, in their entirety, but the average of the total shows that approximately two-thirds were made for sale and one-third for consumption by the producer in further manufacture.

TABLE 50.—DISPOSITION OF FINISHED ROLLED PRODUCTS AND FORGINGS: 1919.  
[Ton, 2,240 pounds.]

CLASS.	TOTAL (SHOWN IN TABLE 47).		FOR CONSUMPTION IN WORKS WHERE PRODUCED.			FOR TRANSFER TO OTHER WORKS OF SAME COMPANY.			FOR SALE.		
	Tonnage.	Value.	Tonnage.		Assigned value.	Tonnage.		Assigned value.	Tonnage.		Value.
			Amount.	Per cent of class total.		Amount.	Per cent of class total.		Amount.	Per cent of class total.	
All finished rolled products and forgings.....	25,512,847	\$1,859,467,051	5,961,232	23.4	\$398,320,778	2,207,838	8.6	\$149,229,387	17,343,747	68.0	\$1,311,906,888
Rails.....	2,088,838	92,849,481	6,087	0.3	290,884	12,087	0.6	732,438	2,070,004	99.1	91,825,159
Re-rolled or renewed rails.....	95,637	4,738,883							95,637	100.0	4,738,883
Rail fastenings.....	462,091	27,595,921	6,768	1.5	242,836	57,885	12.5	2,077,004	398,038	86.0	25,275,081
Structural shapes.....	2,526,461	151,970,064	77,178	3.1	4,196,996	71,029	2.8	3,851,048	2,378,254	94.1	143,922,020
Bars for reinforced concrete.....	301,453	18,428,795	166	0.1	11,919	320	0.1	22,977	300,967	99.8	18,393,899
Merchant bars.....	4,484,997	360,560,457	297,918	6.6	23,259,261	96,629	2.2	8,407,752	4,090,450	91.2	323,893,444
Spike and chain rods, bolt and nut rods, horseshoe bars, etc.....	232,920	15,333,748	210,775	90.5	13,442,131	10,508	4.5	724,461	11,037	5.0	1,167,156
Wire rods.....	2,645,483	149,188,566	1,359,244	51.4	69,425,824	550,936	20.8	27,989,573	735,303	27.8	51,773,659
Plates and sheets.....	6,720,191	523,621,423	1,253,642	18.7	96,939,735	208,574	3.1	17,991,126	5,257,975	78.2	408,690,562
Black plates or sheets for tinning.....	1,084,175	94,456,189	521,211	48.1	45,251,963	555,857	51.3	48,271,835	7,107	0.6	922,391
Skelp.....	2,589,064	151,557,342	1,665,999	64.3	97,727,501	543,794	21.0	31,900,981	379,271	14.7	21,928,860
Hoops, bands, and cotton ties.....	832,212	69,865,330	45,169	5.4	3,625,006	36,049	4.4	2,477,935	750,394	90.2	63,762,889
Nail and tack plate.....	34,579	2,548,485	13,939	40.3	672,417	2,050	5.9	98,902	18,590	53.8	1,777,166
Axles.....	97,813	9,752,973							97,745	99.9	9,746,163
Car and locomotive wheels, rolled or forged.....	117,763	17,044,728							117,718	100.0	17,038,436
Armor plate, gun forgings, and ordnance.....	101,130	55,669,658							101,130	100.0	55,669,658
All other.....	1,097,440	114,245,008	502,506	45.8	38,224,805	61,407	5.6	4,670,253	533,467	48.6	71,349,950

<sup>1</sup> Less than one-tenth of 1 per cent.

Production and disposal of semifinished rolled products and unrolled steel.—The production of semifinished iron and steel products and of unrolled steel in 1919 has been classified as shown in Table 51.

TABLE 51.—DISPOSITION OF SEMIFINISHED PRODUCTS: 1919.  
[Ton, 2,240 pounds.]

CLASS.	Total (tons).	For consumption in works where produced (tons).	FOR SALE OR TRANSFER TO OTHER WORKS.					
			Total (shown in Table 47).		For transfer to other works of same company.		For sale.	
			Tons.	Value.	Tons.	Assigned value.	Tons.	Value.
Partly finished rolled products.....	30,791,409	21,525,539	9,265,930	\$389,596,293	4,420,767	\$179,902,384	4,845,163	\$209,693,909
Blooms, billets, and slabs, steel.....	25,368,210	19,344,165	6,024,044	249,394,083	3,984,695	159,269,669	2,039,349	90,124,414
Roller blooms and billets for forging purposes.....	310,854	124,321	186,533	10,609,833	7,873	389,706	178,660	10,280,127
Hammered charcoal blooms, billets, and slabs.....	51,477	33,092	17,785	920,704	8,411	375,877	9,374	544,827
Sheet and tin-plate bars.....	4,154,429	1,289,851	2,864,578	117,855,738	303,837	13,257,805	2,555,741	104,597,932
Muck and scrap bar.....	806,499	733,809	172,990	10,765,935	110,951	6,009,326	62,039	4,140,609
Unrolled steel.....	33,994,658	32,599,066	1,395,592	162,322,502	507,369	19,548,123	888,223	142,774,379
Ingots.....	33,274,515	32,561,488	713,027	33,315,197	494,014	17,466,849	219,013	15,848,348
Direct castings.....	720,143	37,578	682,565	129,007,305	13,355	2,081,274	609,210	126,920,031

<sup>1</sup> Exclusive of 37,578 tons, valued at \$5,636,700, consumed in works where produced, which are included in Table 47.

Summary as to distribution of products.—Table 52 gives for 1919, 1914, and 1909 comparative statistics of the various principal products of steel works and rolling mills. Duplication due to the same article appearing as product in one case and material in

another of the same or affiliated plants has been eliminated in this table, but this can not be avoided in cases where semifinished rolled products are produced by independent concerns for use in further manufacture.

TABLE 52.—SUMMARY AS TO DISPOSITION OF PRODUCTS: 1919, 1914, AND 1909.  
[Ton, 2,240 pounds.]

CLASS.	Census year.	Total (tons).	For consumption in works where produced (tons).	FOR TRANSFER TO OTHER WORKS OF SAME COMPANY.		IN FORM AND CONDITION FOR SALE.		
				Tons.	Assigned value.	Tons.	Value.	
							Amount.	Per cent of total.
Total.....	1919				\$361,606,731		\$2,467,295,645	100.0
	1914				122,314,580		786,349,885	100.0
	1909				121,474,742		864,247,792	100.0
Finished rolled products and forgings.....	1919	25,512,347	5,961,262	2,207,838	149,229,387	17,343,747	1,311,906,886	53.2
	1914	18,482,182	4,146,403	1,755,432	62,277,390	12,580,257	434,616,787	54.6
	1909	19,270,237	4,045,272	1,205,415	47,035,208	14,024,550	491,997,011	56.9
Semifinished rolled products.....	1919	9,265,930		4,420,767	179,902,384	4,845,163	209,693,909	8.5
	1914	5,408,030		2,749,324	54,584,889	3,058,706	76,090,020	9.6
	1909	6,799,436		3,093,395	66,828,401	3,706,041	86,664,959	10.0
Steel ingots and castings.....	1919	33,994,658	1 32,599,066	507,369	19,548,123	888,223	142,774,379	5.8
	1914	23,383,474	22,758,495	33,950	646,086	591,029	44,945,290	5.6
	1909	23,478,718	22,883,187	112,301	2,080,281	478,250	36,213,639	4.2
Manufactures from rolling-mill products.....	1919						733,001,128	29.7
	1914						206,909,945	26.0
	1909						213,537,183	24.7
Scrap iron and steel.....	1919	11,457,773	9,843,128	773,855	12,926,837	1,340,700	24,487,435	1.0
	1914	7,041,286	5,695,122	462,948	4,674,546	983,216	11,660,297	1.4
	1909	6,364,647	5,126,093	395,436	5,530,852	840,118	12,632,772	1.6
Castings, other than direct steel.....	1919	1 240,037				240,037	16,858,696	0.7
	1914	115,536				115,536	5,314,946	0.7
	1909	128,670				128,670	5,520,399	0.6
Products, other than steel and iron and custom work and repairing.....	1919				( <sup>1</sup> )		28,573,212	1.1
	1914				( <sup>1</sup> )		16,812,720	2.1
	1909				( <sup>1</sup> )		17,681,830	2.1

<sup>1</sup> Includes castings used by the companies producing and in other tables credited to products with value: 37,578 tons, estimated value, \$5,636,700.

<sup>2</sup> Does not include tonnage of cast-iron pipe and fittings valued at \$304,452 which is included in total value.

<sup>3</sup> Included with products "in form and condition for sale."

Remanufactures from rolling-mill products.—Statistics of the principal articles fabricated in rolling mills in 1919, 1914, and 1909 from rolled products are given in Table 53, with the output of the same commodity as reported by establishments engaged primarily in other lines of manufacture. With

respect to the latter products it should be said that figures for quantity production are not available, the establishments reporting only the total value of products, which includes to a greater or less extent products other than the specific one mentioned.

# STEEL WORKS AND ROLLING MILLS.

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TABLE 53.—PRINCIPAL MANUFACTURES FROM ROLLING-MILL PRODUCTS: 1919, 1914, AND 1909.

KIND.	1919	1914	1909	PER CENT OF INCREASE. <sup>1</sup>		KIND.	1919	1914	1909	PER CENT OF INCREASE. <sup>1</sup>	
				1914-1919	1909-1914					1914-1919	1909-1914
Spikes, bolts, nuts, rivets, and washers, etc.: Made in rolling mills— Railroad spikes, bolts, and nuts— Number of establishments.....	18					Pipes and tubes—Continued. Made in rolling mills—Con. Wrought welded—Con. Seamless, hot-finished or cold-drawn— Number of establishments.....	0	5	4		
Kegs (200 pounds).....	1,230,834					Tons.....	165,934	64,765	54,273	156.0	19.3
Value.....	\$10,148,232					Value.....	\$43,774,410	\$5,821,467	\$5,650,739	652.0	3.0
Bolts, nuts, rivets, washers, etc. (except railroad)— Number of establishments.....		43	85			All other— Tons.....	23,097	17,345	17,561	38.2	-1.2
Kegs (200 pounds).....		3,457,710	4,471,985	-20.1	-22.7	Value.....	\$2,351,291	\$834,200	\$980,699	182.0	-15.5
Value.....		\$13,883,773	\$20,538,853	114.0	-32.4	Not made in rolling mills— Number of establishments.....					
Not made in rolling mills— Bolts, nuts, rivets, washers, etc.— Number of establishments.....	26					Value of products.....	\$81,890,115	\$37,655,229	\$30,886,270	117.0	21.9
Kegs (200 pounds).....	1,532,400					Horse and mule shoes: Made in rolling mills— Number of establishments.....					
Value.....	\$19,589,295					Kegs (200 pounds).....	724,539	1,015,230	996,383	-28.6	1.9
Nails and spikes (not wire): Made in rolling mills— Number of establishments.....	144	102	108	283.0	-4.4	Value.....	\$8,420,052	\$7,122,462	\$7,202,897	18.2	-1.1
Value of products.....	\$89,743,882	\$23,403,405	\$24,484,907			Not made in rolling mills— Number of establishments.....					
Not made in rolling mills— Bolts, nuts, rivets, washers, etc.— Number of establishments.....	6	10	12			Value of products.....	\$3,367,001	\$1,785,903	\$1,014,576	88.5	76.0
Kegs (100 pounds).....	263,896	740,430	1,009,319	-64.4	-26.6	Made in rolling mills— Cars, value.....	\$8,507,478				
Value.....	\$1,334,168	\$1,469,780	\$2,218,207	-9.2	-33.7	Machinery, value.....	\$8,964,646				
Wire nails and spikes, made in rolling mills and wire-drawing mills— Kegs (100 pounds).....	12,429,195	12,886,634	13,926,861	-3.5	-7.5	Switches, frogs, and crossings— Tons.....	28,163	\$7,342,690	\$7,720,178	220.1	-4.9
Value.....	\$49,291,686	\$23,368,633	\$27,575,774	110.9	-15.3	Value.....	\$6,029,213				
Wire brads, tacks, and staples, made in rolling mills and wire-drawing mills— Pounds.....	73,682,935	66,670,000	56,250,000	10.5	18.5	Springs: Made in rolling mills— Car— Number of establishments.....					
Value.....	\$3,180,891	\$1,324,948	\$1,324,170	138.6	0.1	Tons.....	17,681	11,889	6,191	59.1	92.0
Not made in rolling mills (nails and spikes)— Number of establishments.....	65	64	57			Value.....	\$2,970,737	\$872,803	\$374,624	200.0	133.0
Chief product— Cut nails, value.....	\$2,056,136	\$1,735,979				Other springs, value.....	\$175,348				
Wire nails, value.....	\$6,135,160	\$1,334,432	\$8,191,820	144.0	-12.1	Not made in rolling mills— Number of establishments.....					
Other, including tacks, value.....	\$9,392,048	\$4,128,189				Value of products.....	\$51,479,535	\$11,594,992	\$9,005,362	344.0	28.8
Pipes and tubes (not including cast pipe): Made in rolling mills— Wrought welded— Boiler tubes— Number of establishments.....	8					Steel and iron wire and manufactures thereof (see Wire). Tin-plate and terneplate dipping departments of rolling mills (see Tin plate and terneplate), value.....	\$191,997,217	\$67,353,214	\$71,624,024	185.0	-0.0
Tons.....	69,550					Sheets, black or common, corrugated, crimped, polished or glanced, made in rolling mills: Number of establishments.....	\$82,920,648	( <sup>2</sup> )	( <sup>2</sup> )		
Value.....	\$11,907,924					Tons.....	223,915	( <sup>2</sup> )	( <sup>2</sup> )		
Casing, tubing, drain, and line pipe for production and transportation of oil and gas, and for other drilled wells— Number of establishments.....	10	13	15			Value.....	\$28,948,958				
Tons.....	922,019	1,130,652	1,314,771	74.3	-14.0	Galvanized plates or sheets, made in rolling mills: Number of establishments.....	23	26	22		
Value.....	\$98,767,381	\$55,461,650	\$68,471,573	259.0	-19.0	Tons.....	555,192	971,189	431,658	-42.8	125.0
Other black pipe— Number of establishments.....	12					Value.....	\$66,793,334	\$42,862,394	\$25,912,056	55.8	65.4
Tons.....	772,114					Hoops and bands, galvanized, made in rolling mills: Number of establishments.....	3				
Value.....	\$70,499,726					Tons.....	44,798	( <sup>2</sup> )	( <sup>2</sup> )		
Other galvanized pipe— Number of establishments.....	10					Value.....	\$3,990,822				
Tons.....	211,348					Structural shapes, fabricated, and pressed, stamped or shaped, made in rolling mills: Number of establishments.....	20				
Value.....	\$23,175,064					Tons.....	363,300	( <sup>2</sup> )	( <sup>2</sup> )		
						Value.....	\$31,340,452				

<sup>1</sup> A minus sign (—) denotes decrease.

<sup>2</sup> Included in tin-plate and terneplate industry as separate establishments.

<sup>3</sup> Not reported separately.

## MANUFACTURES.

## STEEL PRODUCTION.

**Summary.**—A summary of steel production for the last four censuses, by kind and by type of furnace or process, is given in Table 54, with the percentages of increase and distribution. The production of steel slag in 1919 is estimated at 2,826,000 tons; this on the basis of 10 per cent of steel production for basic O-H steel furnaces, 8 per cent for acid O-H steel, and 2.5 per cent for Bessemer steel.

TABLE 54.—STEEL PRODUCTION, BY KINDS: 1919, 1914, 1909, AND 1904.

(Ton, 2,240 pounds.)

KIND.	1919	1914	1909	1904	PER CENT OF INCREASE. <sup>1</sup>			PER CENT DISTRIBUTION.			
					1914-1919	1909-1914	1904-1909	1919	1914	1909	1904
Total <sup>2</sup> .....	34,026,979	23,403,957	23,523,199	13,670,592	45.4	-0.5	72.1	100.0	100.0	100.0	100.0
Open-hearth.....	26,726,036	17,081,375	14,228,377	5,820,397	56.5	20.1	144.0	78.5	73.0	60.5	42.0
Basic.....	25,709,536	16,284,026	13,221,093	5,064,692	58.4	22.7	161.0	75.5	69.4	56.2	37.0
Acid.....	1,016,500	846,749	1,007,284	755,805	20.0	-15.9	33.3	3.0	3.0	4.3	5.5
Bessemer.....	6,946,939	6,219,304	9,180,133	7,768,915	11.7	-32.3	18.2	20.4	26.6	39.0	56.8
Crucible.....	64,245	81,685	100,263	80,059	-21.4	-18.5	25.2	0.2	0.3	0.4	0.6
Electric or electrically refined.....	289,759	21,593	14,426	1,221	1,242.0	40.7	1,081.5	0.9	0.1	0.1	( <sup>3</sup> )
Ingots.....	33,289,939	22,815,266	22,973,964	13,879,083	45.9	-0.7	71.7	100.0	100.0	100.0	100.0
Open-hearth.....	26,099,319	16,551,427	13,725,783	5,548,396	57.7	20.6	147.0	78.4	72.4	59.7	41.5
Basic.....	25,444,169	15,933,420	12,952,840	4,974,921	59.7	23.0	160.0	76.4	69.8	56.4	37.2
Acid.....	655,150	618,007	772,943	573,475	6.0	-20.0	34.8	2.0	2.7	3.4	4.3
Bessemer.....	6,901,315	6,175,867	9,145,668	7,754,488	11.7	-32.4	17.9	20.7	27.1	39.8	58.0
Crucible.....	93,028	72,765	90,242	70,199	-13.4	-19.4	18.4	0.2	0.4	0.4	0.6
Electric or electrically refined.....	226,277	15,207	12,271	.....	1,380.0	23.9	.....	0.7	.....	.....	.....
Castings.....	737,040	588,691	540,235	291,509	25.2	7.2	88.4	100.0	100.0	100.0	100.0
Open-hearth.....	620,717	529,948	502,594	272,001	18.3	5.4	84.8	85.0	90.0	91.5	93.3
Basic.....	265,387	301,206	268,253	89,671	-11.9	12.3	199.0	36.0	51.2	48.8	30.8
Acid.....	361,350	228,742	234,341	182,330	58.0	-2.4	28.5	49.0	38.8	42.7	62.5
Bessemer.....	45,624	43,437	34,465	14,427	5.0	26.0	139.0	6.2	7.4	6.3	4.9
Crucible.....	1,217	8,920	10,021	3,860	-88.4	-11.0	160.0	0.2	1.5	1.8	1.3
Electric or electrically refined.....	63,482	6,388	2,155	1,221	894.0	196.3	76.5	8.6	1.1	0.4	0.4

<sup>1</sup> A minus sign (-) denotes decrease.

<sup>2</sup> Includes steel produced by establishments not classified as "steel works and rolling mills" as follows: 1919—32,321 tons, including open-hearth, 30,815 (basic 14,731, acid 16,084), and electric or electrically refined 1,506; 1914—20,483 tons, including open-hearth 18,090 (basic 1,527, acid 16,563), Bessemer 499, and crucible 1,894; 1909—49,481 tons, including open-hearth 36,099 (basic 10,674, acid 25,425), Bessemer 6,066, crucible and miscellaneous, 7,310; 1904—4,184 tons, including open-hearth (basic) 2,440, Bessemer 774, crucible and miscellaneous, 970.

<sup>3</sup> Less than one-tenth of 1 per cent.

**Production, by states.**—Table 55 presents the figures and 1914 by kind—open-hearth, Bessemer, and all for steel production, by states, distributed for 1919 other steels.

TABLE 55.—STEEL PRODUCTION, BY KIND AND BY STATES: 1919, 1914, 1909, AND 1904.

(Ton, 2,240 pounds.)

STATE.	1919	1914	1909	1904	PER CENT DISTRIBUTION.				OPEN-HEARTH STEEL.		BESSEMER STEEL.		CRUCIBLE, ELECTRIC, AND MISCELLANEOUS.	
					1919	1914	1909	1904	1919	1914	1919	1914	1919	1914
Total.....	34,026,979	23,403,957	23,523,199	13,670,592	100.0	100.0	100.0	100.0	26,726,036	17,081,375	6,946,939	6,219,304	354,004	103,278
California.....	139,866	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	0.4	.....	.....	.....	135,415	( <sup>1</sup> )	.....	( <sup>1</sup> )	4,451	.....
Delaware.....	104,837	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	0.3	.....	.....	.....	101,573	( <sup>1</sup> )	.....	( <sup>1</sup> )	.....	.....
Illinois.....	2,612,204	1,770,753	2,071,087	1,556,198	7.7	7.6	11.4	11.4	1,661,073	891,336	901,010	867,804	60,121	11,613
Indiana.....	3,133,640	1,662,839	779,778	81,589	9.2	7.1	3.3	0.6	3,121,344	1,662,441	9,261	.....	8,085	398
Kentucky.....	268,687	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	0.8	.....	.....	.....	223,782	( <sup>1</sup> )	44,905	( <sup>1</sup> )	.....	.....
Massachusetts.....	185,587	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	0.5	.....	.....	.....	183,740	( <sup>1</sup> )	360	( <sup>1</sup> )	1,481	.....
Michigan.....	24,754	8,245	10,450	2,500	0.1	( <sup>1</sup> )	( <sup>2</sup> )	( <sup>3</sup> )	12,089	2,819	3,337	1,645	9,328	1,781
New Jersey.....	204,150	140,495	95,851	68,288	0.6	0.6	0.4	0.5	183,168	127,285	3,962	7,414	17,020	5,796
New York.....	1,196,881	745,441	1,115,280	474,253	3.5	3.2	4.8	3.5	1,074,444	603,642	58,769	119,998	63,668	21,801
Ohio.....	8,176,993	5,451,508	4,713,869	2,529,907	24.0	23.3	20.0	18.5	5,078,637	2,591,062	3,039,293	2,860,129	58,063	317
Pennsylvania.....	15,308,086	11,851,400	12,206,608	7,733,040	44.9	50.6	51.9	56.6	12,598,507	9,754,523	2,583,392	2,039,274	126,187	57,603
West Virginia.....	331,407	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	1.0	.....	.....	.....	94,678	( <sup>1</sup> )	238,729	( <sup>1</sup> )	.....	.....
Wisconsin.....	32,821	18,604	21,883	9,215	0.1	0.1	0.1	0.1	15,986	12,435	5,776	4,302	11,059	1,867
All other states <sup>2</sup> .....	2,808,066	1,756,072	1,908,418	1,215,907	6.9	7.5	8.1	8.9	2,241,594	1,435,832	56,881	318,733	9,591	2,102

<sup>1</sup> Included with "All other states."<sup>2</sup> Less than one-tenth of 1 per cent.

<sup>3</sup> Includes, in the order of production in 1919, Alabama, Colorado, Maryland, Minnesota, Connecticut, Washington, Georgia, Rhode Island, Missouri, Utah, District of Columbia, Iowa, Oregon, and Virginia; and in 1914, 1909, and 1904, also Kentucky, Massachusetts, West Virginia, California, and Delaware.

**Disposal of output.**—The disposition made of the steel product, whether sold to unaffiliated concerns, or used in the establishment producing it, or in other works of the same company, is given in Table 56 for 1919, 1914, and 1909.

TABLE 56.—STEEL PRODUCTION, FOR CONSUMPTION AND FOR SALE: 1919, 1914, AND 1909.

[Ton, 2,240 pounds.]

Kind.	Census year.	Total.	FOR CONSUMPTION BY PRODUCING COMPANY.			For sale.
			Total for consumption.	In works where produced.	For transfer to other works of same company.	
Total.....	1919	34,026,979	33,129,598	13,215,754	513,844	*897,381
	1914	23,403,957	22,803,890	12,769,940	33,950	*600,067
	1909	23,523,199	23,033,040	22,920,739	112,301	490,159
Open-hearth.....	1919	26,726,036	25,951,030	25,627,493	323,837	774,706
	1914	17,081,375	16,540,828	16,508,741	32,087	540,547
	1909	14,228,377	13,781,534	13,709,101	72,433	446,843
Basic.....	1919	25,709,536	25,201,989	24,984,654	307,335	417,547
	1914	16,234,626	15,908,628	15,876,624	32,004	325,998
	1909	13,221,093	12,977,845	12,908,030	69,815	243,248
Acid.....	1919	1,016,500	659,341	642,839	16,502	357,159
	1914	846,749	632,200	632,117	83	214,549
	1909	1,007,284	803,689	801,071	2,618	203,595
Bessemer.....	1919	6,946,939	6,891,705	6,703,550	188,146	55,233
	1914	6,219,304	6,175,865	6,174,094	1,761	43,449
	1909	9,180,133	9,148,539	9,108,813	39,726	31,594
Crucible.....	1919	64,245	62,908	62,473	435	1,337
	1914	81,635	72,034	71,632	102	9,651
	1909	100,263	88,890	88,748	142	11,373
Electric or electrically refined.....	1919	289,759	223,654	222,228	1,426	66,105
	1914	21,593	15,173	15,173	.....	6,420
	1909	14,426	14,077	14,077	.....	349

<sup>1</sup> Includes in 1919, 32,576,219 tons of ingots and 39,535 tons of castings, the latter distributed as follows: Basic O-H 22,705 tons; acid O-H, 15,803 tons; Bessemer, 615 tons; and electric or electrically refined, 317 tons; and in 1914, 22,751,830 tons of ingots and 18,110 tons of castings, the latter distributed as follows: Basic O-H, 716 tons; acid O-H, 16,560 tons; and crucible, 834 tons.

<sup>2</sup> Includes in 1919, 219,013 tons of ingots and 678,308 tons of castings, the latter distributed as follows: Basic O-H, 240,644 tons; acid O-H, 329,071 tons; Bessemer, 45,004 tons; Crucible, 1,217 tons; and electric or electrically refined, 62,432 tons; and in 1914, 29,480 tons of ingots and 570,581 tons of castings, the latter distributed as follows: Basic O-H, 300,490 tons; acid O-H, 212,182 tons; Bessemer, 43,437 tons; Crucible, 8,086 tons; and electric and all other, 6,386 tons.

**Duplex steel.**—The production of duplex steel, that is steel semifinished in Bessemer converters and finished in open-hearth or electric furnaces was reported in 1919 by 9 establishments, distributed as follows—Illinois, 1; Indiana, 2; Maryland, 1; New York, 1; and Pennsylvania, 4. The total production amounted to 2,078,841 tons in 1919, compared with 401,621 tons in 1914, and 522,682 tons in 1909.

**Alloy steel.**—Statistics of the production of the alloy steels in 1919, 1914, and 1909, are given in Table 57. The production is distributed by method of production or type of furnace, by method of casting whether into ingots for rolling or direct castings, and by kind of alloy.

Of the total production of alloy steel, approximately one-third was used in the manufacture of structural shapes, 30 per cent for merchant bars, and 6 per cent each for rails, armor plate, and ordnance.

TABLE 57.—ALLOY STEEL: 1919, 1914, AND 1909.  
[Ton, 2,240 pounds.]

KIND.	1919	1914	1909	PER CENT OF INCREASE. <sup>1</sup>		PER CENT DISTRIBUTION.		
				1914-1919	1909-1914	1919	1914	1909
Number of establishments.....	82	57	36	43.0	58.3	.....	.....	.....
Production, tons.....	1,242,878	305,956	158,216	306.2	93.4	100.0	100.0	100.0
Open-hearth.....	993,015	204,100	100,335	276.0	163.2	79.9	80.3	63.4
Basic.....	844,852	230,408	86,242	266.7	167.2	68.0	75.3	54.5
Acid.....	148,163	33,692	14,093	339.8	139.0	11.9	11.0	8.9
Bessemer.....	30,618	9,146	45,324	234.8	-79.8	2.5	3.0	28.7
Crucible and electric.....	219,245	32,710	12,557	570.2	160.5	17.0	10.7	7.9
Ingots.....	1,203,609	294,128	151,300	309.2	94.4	96.8	96.1	95.6
Castings.....	39,269	11,828	6,916	232.0	71.0	3.2	3.9	4.4
By kind of alloy:								
Nickel-chrome.....	224,280	102,562	26,029	119.0	281.0	18.0	33.6	17.0
Nickel.....	158,951	69,955	37,007	127.0	86.0	12.8	22.9	23.8
Chrome-vanadium.....	126,407	9,280	4,400	1,262.0	111.0	10.2	3.0	2.8
Chrome.....	121,983	23,258	11,209	424.0	106.0	9.8	7.6	7.1
Vanadium.....	118,338	2,565	8,039	4,511.0	-68.1	9.5	0.8	5.1
Titanium.....	52,152	8,477	40,477	515.0	-79.1	4.2	2.8	25.6
Copper.....	31,000	2,759	.....	1,027.0	.....	2.5	0.9	.....
Silicon.....	29,436	.....	.....	.....	.....	2.4	.....	.....
Tungsten.....	27,318	4,204	1,697	550.6	148.0	2.2	1.4	1.0
Silicon-manganese.....	9,730	2,240	( <sup>2</sup> )	334.0	.....	0.8	0.7	( <sup>2</sup> )
Chrome-tungsten-vanadium.....	2,735	2,334	( <sup>2</sup> )	17.2	.....	0.2	0.8	( <sup>2</sup> )
Chrome-tungsten.....	758	1,546	600	-51.0	157.7	( <sup>2</sup> )	0.5	0.4
Nickel-chrome-vanadium.....	.....	14,123	9,280	.....	52.1	.....	4.6	5.9
Chrome-nickel-titanium.....	.....	1,106	( <sup>2</sup> )	.....	.....	.....	0.4	( <sup>2</sup> )
Miscellaneous.....	80,893	233	( <sup>2</sup> )	.....	.....	6.5	( <sup>2</sup> )	11.3
Unclassified.....	259,397	61,314	17,912	.....	.....	20.9	20.1	.....

<sup>1</sup> A minus sign (-) denotes decrease.

<sup>2</sup> Less than one-tenth of 1 per cent.

<sup>3</sup> Figures not available.

**Steel-making equipment and capacity of steel furnaces.**—Table 58 shows, by states, the daily capacity in tons, of steel on double turn, of the active plants in 1919, together with the production tonnage for the year and the furnace distribution, by states, of capacity and production.

TABLE 58.—STEEL FURNACE CAPACITY AND PRODUCTION, BY STATES: 1919.  
[Ton, 2,240 pounds.]

STATE.	Daily capacity, tons of steel.	Steel production, tons. <sup>1</sup>	PER CENT DISTRIBUTION.	
			Capacity.	Production.
United States.....	193,115	34,026,979	100.0	100.0
Pennsylvania.....	80,325	15,308,086	41.6	45.0
Ohio.....	39,946	8,175,993	20.7	24.0
Illinois.....	16,387	2,612,204	8.5	7.7
Indiana.....	14,021	3,133,640	7.3	9.2
New York.....	11,467	1,196,881	5.9	3.5
Maryland.....	( <sup>2</sup> )	( <sup>2</sup> )	4.8	( <sup>2</sup> )
Alabama.....	5,028	( <sup>2</sup> )	2.6	( <sup>2</sup> )
Colorado.....	3,167	( <sup>2</sup> )	1.6	( <sup>2</sup> )
Kentucky.....	3,070	268,087	1.6	0.8
West Virginia.....	2,035	331,407	1.0	1.0
Minnesota.....	1,524	( <sup>2</sup> )	0.8	( <sup>2</sup> )
New Jersey.....	1,147	204,150	0.6	0.6
California.....	1,128	139,880	0.6	0.4
Delaware.....	1,045	104,837	0.5	0.3
Massachusetts.....	965	185,587	0.5	0.5
Wisconsin.....	410	32,821	0.2	0.1
Connecticut.....	432	( <sup>2</sup> )	0.2	( <sup>2</sup> )
Georgia.....	340	( <sup>2</sup> )	0.2	( <sup>2</sup> )
Washington.....	321	( <sup>2</sup> )	0.2	( <sup>2</sup> )
Missouri.....	312	( <sup>2</sup> )	0.2	( <sup>2</sup> )
Michigan.....	301	24,754	0.1	0.1
Utah.....	187	( <sup>2</sup> )	0.1	( <sup>2</sup> )
Rhode Island.....	151	( <sup>2</sup> )	0.1	( <sup>2</sup> )
District of Columbia.....	120	( <sup>2</sup> )	0.1	( <sup>2</sup> )
All other states.....	95	* 2,308,056	( <sup>2</sup> )	6.8

<sup>1</sup> Not including steel produced in establishments not included in the classified industry with a daily capacity of 2,157 tons.

<sup>2</sup> Included under "All other states" to avoid disclosure of individual operations.

<sup>3</sup> Includes the product of the states noted above, these states reporting in the aggregate steel furnaces with a total daily capacity of 20,888 tons of steel.

<sup>4</sup> Less than one-tenth of 1 per cent.

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On a basis of 300 working days, double turn, the annual capacity of all establishments was approximately 58,000,000 tons, an increase of 30 per cent over 1914, and the production in 1919 amounted to approximately 60 per cent of capacity compared with 53 per cent in 1914 and 72 per cent in 1909.

**Mixers.**—Table 59 shows the number and capacity of the metal mixers as reported for the steel plants at the censuses of 1919 and 1914, distributed by states.

TABLE 59.—METAL MIXERS: 1919 AND 1914.

	1919		1914	
	Num-ber.	Capacity (tons).	Num-ber.	Capacity (tons).
Total.....	86	38,605	69	20,885
Alabama.....	3	1,250	(1)	(1)
Illinois.....	8	3,350	9	2,300
Indiana.....	6	3,200	5	1,500
Maryland.....	4	2,630	(1)	(1)
New York.....	6	2,525	3	1,150
Ohio.....	17	5,590	15	4,300
Pennsylvania.....	36	18,360	30	9,085
West Virginia.....	1	250	1	250
All other states.....	5	1,450	6	2,300

<sup>1</sup> Included with "All other states."

**Open-hearth furnaces.**—Statistics for open-hearth furnaces for 1919, 1914, and 1909, by type of furnace, are presented in Table 60, and the distribution, by size, is shown in Table 61. The average capacity per heat or melt was 52 tons in 1919 and 1914 and 43 tons in 1909.

TABLE 60.—STEEL FURNACES—OPEN-HEARTH, BY KINDS AND BY STATES: 1919 AND 1914.

[Ton, 2,240 pounds.]

STATE.	Census year.	TOTAL.			BASIC.			ACID.		
		Number of establishments.	Number.	Daily capacity (tons).	Number of establishments.	Number.	Daily capacity (tons).	Number of establishments.	Number.	Daily capacity (tons).
United States....	1919	207	1,252	135,922	136	1,039	126,971	94	213	8,951
	1914	140	864	93,650	99	706	85,471	66	158	8,176
	1909	129	706	82,161	82	553	55,392	70	153	6,769
	1904	110	489	34,308	64	341	26,932	65	148	7,466
Pennsylvania.....	1919	83	582	60,839	51	460	54,850	49	122	5,989
	1914	66	488	51,071	45	383	45,689	38	105	5,382
Ohio.....	1919	32	222	24,569	24	200	24,080	9	13	489
	1914	20	112	13,087	16	104	12,561	5	8	526
Indiana.....	1919	10	93	12,495	4	73	11,862	7	20	633
	1914	6	62	8,570	2	54	8,200	4	8	370
New York.....	1919	11	57	8,498	7	47	8,092	4	10	436
	1914	8	33	3,712	4	25	3,392	4	8	320
Illinois.....	1919	13	91	8,165	13	91	8,165			
	1914	10	60	6,608	9	56	6,345	3	4	263
Maryland.....	1919	2	13	5,593	2	13	5,593			
	1914	2	8	1,825	2	8	1,825			
Alabama.....	1919	2	16	3,496	2	16	3,496			
	1914	2	15	3,195	2	15	3,195			
Kentucky.....	1919	2	14	2,470	2	14	2,470			
	1914	1	6	625	1	5	500	1	1	125
Colorado.....	1919	1	15	1,500	1	15	1,500			
	1914	1	15	1,500	1	15	1,500			

TABLE 60.—STEEL FURNACES—OPEN-HEARTH, BY KINDS AND BY STATES: 1919 AND 1914—Continued.

STATE.	Census year.	TOTAL.			BASIC.			ACID.		
		Number of establishments.	Number.	Daily capacity (tons).	Number of establishments.	Number.	Daily capacity (tons).	Number of establishments.	Number.	Daily capacity (tons).
Minnesota.....	1919	2	11	1,483	1	10	1,479	1	1	4
	1919	7	19	1,103	7	18	1,073	1	1	30
	1914	4	6	800	4	6	800			
Delaware.....	1919	3	11	973	2	9	960	1	2	13
	1914	2	4	109				2	4	109
New Jersey.....	1919	8	27	945	4	11	495	6	16	450
	1914	5	18	752	4	9	491	4	9	261
Massachusetts.....	1919	7	19	927	2	6	400	6	13	527
	1914	3	10	570	2	5	207	2	5	273
West Virginia.....	1919	3	7	405	1	4	320	2	3	85
	1914	2	4	285	1	3	245	1	1	40
Connecticut.....	1919	3	6	388	2	5	368	1	1	20
	1914	1	3	250	1	3	250			
Georgia.....	1919	2	4	345	1	3	340	1	1	5
	1914	1	2	185	1	2	185			
Missouri.....	1919	2	11	456	2	11	456			
	1914	1	8	306	1	8	306			
Rhode Island.....	1919	1	3	150	1	3	150			
	1914	1	2	100	1	2	100			
Michigan.....	1919	4	6	175				4	6	175
	1914	1	1	40	1	1	40			
District of Columbia.....	1919	1	3	120	1	3	120			
	1914	1	2	50	1	2	50			
Wisconsin.....	1919	3	6	115	1	2	20	2	4	95
	1914	2	5	510				2	5	510
All other states <sup>1</sup> .....	1919	5	16	712	5	16	712			
	1914									

<sup>1</sup> Comprises Iowa, Utah, and Washington.

TABLE 61.—STEEL FURNACES—OPEN-HEARTH, BY SIZE: 1919, 1914, AND 1909.

[Ton, 2,240 pounds.]

SIZE GROUP.	1919		1914		1909	
	Num-ber.	Capacity per heat or melt (tons).	Num-ber.	Capacity per heat or melt (tons).	Num-ber.	Capacity per heat or melt (tons).
Total.....	1,341	69,367	864	44,616	706	30,574
Less than 50 tons.....	576	13,857	346	8,673	367	8,676
50 to 59 tons.....	224	11,813	189	9,673	137	6,929
60 to 69 tons.....	180	7,935	127	7,695	105	6,365
70 to 79 tons.....	132	9,600	92	6,750	51	3,790
80 to 99 tons.....	170	14,230	57	4,725	44	3,567
100 tons.....	79	7,900	38	3,800		
Over 100 tons <sup>1</sup> .....	30	4,532	15	3,300	2	250

<sup>1</sup> Includes for 1919, 11 furnaces, 101-109 tons; 3, 110 tons; 3, 140 tons; and 3, 200 tons.

**Converters.**—Table 62 presents the statistics for the converters, by states and by type—Bessemer, Tropenas, or other—for the United States for the four census years 1904-1919, inclusive, and by states for 1919 and 1914. Of these converters, 31 with a daily capacity of 2,080 tons, were used for the manufacture of duplex steel in 1919, and 12 converters of 12,600 tons daily capacity in 1914.

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TABLE 62.—STEEL FURNACES—CONVERTERS, BY KINDS AND BY STATES: 1919 AND 1914.

[Ton, 2,240 pounds.]

STATE.	Census year.	Number of establishments.	TOTAL.		BESSEMER.		TROPE-NAS.		OTHER KINDS.	
			Number.	Daily capacity (tons).	Number.	Daily capacity (tons).	Number.	Daily capacity (tons).	Number.	Daily capacity (tons).
United States....	1919	105	201	55,931	91	55,024	76	503	34	404
	1914	55	115	53,106	64	52,480	30	354	21	272
	1909	54	112	49,005	60	48,377	24	348	19	280
	1904	44	92	43,123	61	42,675	13	95	18	353
Pennsylvania.....	1919	21	48	19,101	20	18,888	16	81	3	132
	1914	13	31	19,834	24	19,730	5	34	2	70
Ohio.....	1919	23	39	15,291	16	15,060	12	147	11	84
	1914	14	24	14,572	14	14,480	6	82	4	30
Illinois.....	1919	10	22	8,090	9	8,000	10	83	3	7
	1914	4	11	7,057	8	7,000	3	67	—	—
Maryland.....	1919	1	7	3,500	7	3,500	—	—	—	—
	1914	1	3	2,100	3	2,100	—	—	—	—
New York.....	1919	5	11	2,558	4	2,500	5	55	2	3
	1914	2	8	2,830	4	2,780	4	50	—	—
Colorado.....	1919	2	3	1,660	2	1,667	—	—	1	2
	1914	1	2	2,000	2	2,000	—	—	—	—
West Virginia.....	1919	2	4	1,630	4	1,630	—	—	—	—
	1914	2	4	1,490	4	1,490	—	—	—	—
Alabama.....	1919	1	3	1,500	3	1,500	—	—	—	—
	1914	1	2	2,200	2	2,200	—	—	—	—
Kentucky.....	1919	1	2	600	2	600	—	—	—	—
	1914	1	2	600	2	600	—	—	—	—
Wisconsin.....	1919	6	10	142	3	60	3	35	4	47
	1914	5	8	111	—	—	6	76	2	35
All other states.....	1919	33	52	1,850	12	1,619	30	102	10	129
	1914	11	20	302	1	120	6	45	13	137

<sup>1</sup> Comprises for 1919: Michigan, 5; 3 each for Delaware, Indiana, Massachusetts, and Washington; 2 each for California, Indiana, Iowa, and New Jersey; and 1 each for Connecticut, Minnesota, Missouri, Oregon, Tennessee, Texas, Utah, and Virginia; and in 1914: Delaware, 3; 2 each for Michigan and New Jersey; and 1 each for California, Connecticut, Massachusetts, and Oregon.

Crucible furnaces.—Table 63 presents the statistics for crucible-furnace equipment, by states, for 1919 and 1914, with aggregate figures for the last four censuses.

TABLE 63.—STEEL FURNACES—CRUCIBLE, BY STATES: 1919 AND 1914.

[Ton, 2,240 pounds.]

STATE.	Census year.	Number of establishments.	Number of furnaces.	Number of pots.	Daily capacity, tons of steel, double turn.
United States.....	1919	37	120	2,751	706
	1914	62	241	3,916	886
	1909	67	278	4,074	886
	1904	44	160	2,723	717
Pennsylvania.....	1919	20	59	1,836	490
	1914	26	97	2,358	570
New York.....	1919	8	26	532	139
	1914	6	24	508	127
New Jersey.....	1919	2	19	239	45
	1914	6	10	346	87
Illinois.....	1919	1	2	60	15
	1914	2	8	96	21
Michigan.....	1919	1	4	8	10
	1914	3	17	68	8
Massachusetts.....	1919	3	6	44	5
	1914	4	10	82	10
Indiana.....	1919	1	3	24	1
	1914	2	5	56	12
Rhode Island.....	1919	1	1	8	1
	1914	1	1	8	1
All other states <sup>1</sup> .....	1914	12	60	394	41

<sup>1</sup> All other states comprise: Delaware, Minnesota, Ohio, Tennessee, and Wisconsin.

Electric furnaces.—Table 64 in like manner presents the statistics for the electric furnaces installed in steel plants, by states, for 1919 and 1914.

TABLE 64.—STEEL FURNACES—ELECTRIC, BY STATES: 1919 AND 1914.

STATE.	Census year.	Number of establishments.	Number of furnaces.	Daily capacity, tons of steel, double turn.	STATE	Census year.	Number of establishments.	Number of furnaces.	Daily capacity, tons of steel, double turn.
United States.....	1919	72	1,215	2,713	New Jersey.....	1919	3	7	93
	1914	15	115	438		1914	2	2	38
	1909	4	4	285	Indiana.....	1919	4	5	70
Pennsylvania.....	1919	23	45	605		1914	3	14	70
	1914	4	4	124	California.....	1919	1	1	3
Illinois.....	1919	4	19	455		1914	1	1	—
	1914	1	1	100	Minnesota.....	1919	1	3	51
Ohio.....	1919	7	21	337		1914	2	3	38
	1914	1	1	25	Massachusetts.....	1919	1	1	83
New York.....	1919	7	22	309		1914	1	1	—
	1914	2	2	32	Alabama.....	1919	1	5	30
Wisconsin.....	1919	7	10	183	Washington.....	1919	2	11	31
	1914	1	1	5	Virginia.....	1919	1	4	29
Maryland.....	1919	1	6	120		1914	1	1	—
Michigan.....	1919	3	17	126	Iowa.....	1919	1	2	16
	1914	1	1	25	Connecticut.....	1919	1	4	16
					Missouri.....	1919	1	2	6
					All other states.....	1919	15	32	3
						1914	1	1	—

<sup>1</sup> Includes 99 Herault furnaces, 1,942 tons; 14 Snyder, 213 tons; 4 Moore, 79 tons; 3 Ludlum, 75 tons; 2 Pittsburgh, 50 tons; 1 each Gronwald-Dixon, Industrial, Booth-Hall, Gruner-Escholle, Rennerfelt, Girod, Webb, and Greene, with a total capacity of 188 tons; and 32 electric furnaces of 206 tons, in establishments not classified as "steel works and rolling mills."

<sup>2</sup> Includes 10 Herault furnaces, 422 tons; 3 Stassano, 9 tons; 1 Girod, 2 tons; and 1 Snyder, 5 tons.

<sup>3</sup> All other states comprise: Colorado, Georgia, Louisiana, Nebraska, Oklahoma, Oregon, Texas, and Utah.

<sup>4</sup> District of Columbia.

Materials, products, and equipment, in detail, by states.—Detailed statistics for states are presented in Table 65 for 1919 with respect to materials and prod-

ucts. The detailed statistics for steel production, for remanufactures or fabrications, and for equipment, have been given in prior tables.



## MANUFACTURES.

TABLE 65.—MATERIALS AND PRODUCTS—DETAILED STATISTICS, BY STATES: 1919.

[Ton, 2,240 pounds.]

KIND AND STATE.	QUANTITY (TONS).			Cost.	KIND AND STATE.	QUANTITY (TONS).			Cost.
	Total.	Produced by consumer (in other works).	Purchased.			Total.	Produced by consumer (in other works).	Purchased.	
MATERIALS.					MATERIALS—continued.				
Total cost.....				\$1,680,575,758	Iron and steel for furnaces and hot rolls—Continued.				
Alabama.....				49,334,475	Rails for rerolling.....	165,459		165,459	\$4,154,381
California.....				9,508,535	Pennsylvania.....	72,432		72,432	1,856,410
Connecticut.....				4,241,854	All other states.....	93,027		93,027	2,297,971
Delaware.....				3,801,615	Steel, crude and semifinished, not produced in works where consumed (ingots, blooms, billets, slabs, and sheet and tin-plate bars).....	8,940,227	4,401,127	4,545,100	368,061,815
Illinois.....				100,319,478	Alabama.....	364,969	(1)	(1)	13,383,929
Indiana.....				113,194,279	Illinois.....	183,208	(1)	(1)	6,539,399
Kentucky.....				12,713,691	Indiana.....	654,313	218,084	436,329	26,896,938
Maryland.....				15,020,437	Michigan.....	13,315	(1)	(1)	845,510
Massachusetts.....				19,236,480	New Jersey.....	36,408	(1)	(1)	2,732,147
Michigan.....				2,901,803	New York.....	76,728	(1)	(1)	4,028,195
Missouri.....				5,060,622	Ohio.....	2,777,117	1,580,035	1,197,082	114,353,375
New Jersey.....				34,326,805	Pennsylvania.....	3,824,293	1,926,442	1,897,821	157,391,269
New York.....				54,816,314	West Virginia.....	582,541	130,520	452,021	23,025,492
Ohio.....				381,059,073	All other states.....	433,365	248,756	184,609	18,805,061
Pennsylvania.....				777,472,690	Iron muck and scrap bar.....	235,003	106,800	128,203	14,175,954
West Virginia.....				50,794,481	New York.....	17,164		17,164	1,316,533
Wisconsin.....				14,345,964	Ohio.....	20,093		20,093	1,247,649
All other states.....				31,766,553	Pennsylvania.....	172,834	106,143	66,741	10,448,106
Iron and steel for furnaces and hot rolls.					All other states.....	24,862	657	24,205	1,165,666
Pig iron.....	23,919,958	21,170,136	2,749,822	581,517,335	Rolled forms for further manufacture.				
California.....	12,798	(1)	12,798	574,580	Total consumption, including that rolled in the same works: Tons.				
Connecticut.....	23,745	(1)	23,745	749,323	Skelp.....	2,425,845	759,846	322,082	437,764
Delaware.....	50,606	(1)	50,606	1,454,457	Pennsylvania.....	1,238,852	644,495	225,546	418,949
Illinois.....	2,287,638	2,090,153	197,485	55,419,583	All other states.....	1,126,993	96,536	18,815	6,075,320
Indiana.....	2,109,215	2,057,837	51,378	40,468,463	Wire rods.....	1,375,949	21,322	5,794	1,948,322
Kentucky.....	164,847	(1)	164,847	5,232,031	Ore.				
Massachusetts.....	63,748	(1)	63,748	2,320,259	Crude iron ore.....	1,014,989		1,014,989	7,185,058
Missouri.....	62,405	(1)	62,405	2,119,175	Domestic.....	1,009,714			
New Jersey.....	89,193	(1)	89,193	3,716,113	Foreign.....	5,275			21,021
New York.....	900,198	(1)	900,198	20,393,617	California.....	1,985		1,985	471,181
Ohio.....	5,784,072	5,171,519	612,553	137,971,046	Illinois.....	74,502		74,502	708,080
Pennsylvania.....	10,325,070	9,133,062	1,188,108	259,320,858	Indiana.....	131,880		131,880	197,867
West Virginia.....	284,851	(1)	284,851	7,453,903	New York.....	24,885		24,885	1,031,435
Wisconsin.....	8,711	(1)	8,711	395,691	Ohio.....	147,753		147,753	4,204,107
All other states.....	1,752,861	1,668,953	83,908	37,900,206	Pennsylvania.....	567,238		567,238	34,581
Ferro and other alloys:					West Virginia.....	4,142		4,142	396,786
Spiegelisen and ferromanganese.....	347,095	123,353	223,742	41,479,431	All other states.....	62,604		62,604	
California.....	539	(1)	539	98,601	Manganiferous ore (domestic, 17,685; foreign, 24).....	17,709		17,709	234,619
Connecticut.....	451	(1)	451	31,271	Chrome and other ores.....	19,093		19,093	1,060,845
Delaware.....	1,037	(1)	1,037	205,818	Domestic.....	17,508			
Illinois.....	24,245	(1)	24,245	3,294,723	Foreign.....	1,585			8,760
Indiana.....	25,629	(1)	25,629	2,932,080	California.....	221		221	144,720
Massachusetts.....	1,905	(1)	1,905	278,465	Indiana.....	2,046		2,046	906,925
Michigan.....	550	(1)	550	123,437	All other states.....	16,826		16,826	
New Jersey.....	4,551	(1)	4,551	636,157	Other materials.				
New York.....	18,460	(1)	18,460	1,652,942	Copper ingots, billets, blooms, bars, and scrap.....	45,072		45,072	13,907,021
Ohio.....	81,241	(1)	81,241	10,312,966	Ohio.....	1,130		1,130	197,766
Pennsylvania.....	156,716	66,215	90,501	18,023,539	All other states.....	43,942		43,942	13,709,255
West Virginia.....	2,088	(1)	2,088	319,720	Zinc (spelter and retreated zinc).....	80,380		80,380	12,283,608
Wisconsin.....	829	(1)	829	137,809	Ohio.....	35,312		35,312	6,314,312
All other states.....	28,854	10,449	18,405	3,431,864	Pennsylvania.....	15,389		15,389	2,494,604
Other ferro and nonferro alloys—					West Virginia.....	3,526		3,526	582,837
California.....	1,576	(1)	1,576	331,731	All other states.....	26,153		26,153	2,891,855
Connecticut.....	147	(1)	147	14,469	All other materials.....				\$10,817,464
Delaware.....	217	(1)	217	12,220	PRODUCTS.				
Illinois.....	7,037	(1)	7,037	2,076,635	Total value.....				
Indiana.....	10,002	(1)	10,002	1,268,590	Alabama.....				64,980,154
Massachusetts.....	627	(1)	627	61,140	California.....				18,191,989
Michigan.....	496	(1)	496	75,197	Connecticut.....				9,583,036
New Jersey.....	1,836	(1)	1,836	879,598	Delaware.....				7,115,083
New York.....	3,281	(1)	3,281	3,345,620	Illinois.....				173,344,650
Ohio.....	16,686	(1)	16,686	8,104,599	Indiana.....				199,273,518
Pennsylvania.....	44,015	4,490	39,525	14,808,325	Kentucky.....				18,318,690
West Virginia.....	1,453	(1)	1,453	213,851	Maryland.....				19,884,154
Wisconsin.....	627	(1)	627	44,104	Massachusetts.....				30,969,601
All other states.....	4,889	(1)	4,889	769,220	Michigan.....				8,344,643
Total consumption, including scrap made in the same works:					Missouri.....				12,587,067
Scrap (including old rails not intended for rerolling): Tons.					New Jersey.....				74,382,205
Alabama.....	16,369,210	7,026,082	1,480,260	5,545,822	New York.....				100,592,636
California.....	256,414	105,404	(1)	1,863,200	Ohio.....				626,370,025
Connecticut.....	258,230	217,333	217,333	4,833,322	Pennsylvania.....				1,296,412,070
Delaware.....	51,181	36,958	636,958	671,399	West Virginia.....				85,036,489
Illinois.....	62,476	28,551	28,551	560,717	Wisconsin.....				23,398,631
Indiana.....	1,033,328	511,100	91,870	10,387,892	All other states.....				55,173,035
Kentucky.....	1,641,660	554,561	(1)	10,148,850					
Maryland.....	143,488	68,999	98,999	2,100,050					
Massachusetts.....	150,156	27,481	27,481	588,253					
Michigan.....	148,892	117,436	(1)	2,637,573					
Missouri.....	17,676	15,352	(1)	444,816					
New Jersey.....	45,604	36,847	36,847	926,735					
New York.....	166,726	119,139	119,139	3,023,938					
Ohio.....	595,874	170,861	170,861	4,799,356					
Pennsylvania.....	3,377,888	1,365,875	455,114	25,982,418					
West Virginia.....	7,726,558	3,223,528	883,333	68,166,998					
Wisconsin.....	107,138	65,367	(1)	1,307,214					
All other states.....	32,666	26,850	26,850	664,080					
	556,376	304,330	18,933	6,156,240					

1 Included in total.

## STEEL WORKS AND ROLLING MILLS.

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TABLE 65.—MATERIALS AND PRODUCTS—DETAILED STATISTICS, BY STATES: 1919—Continued.

[Ton, 2,240 pounds.]

KIND AND STATE.	QUANTITY (TONS).			Value.	KIND AND STATE.	QUANTITY (TONS).			Value.
	Total.	For sale.	For consumption.			Total.	For sale.	For consumption.	
PRODUCTS—continued.					PRODUCTS—continued.				
I. Rolled, forged, and other classified steel and iron products.....	36,211,947	23,114,711	13,097,236	\$2,417,012,546	Iron and steel rods, total.....	2,878,403			\$164,522,314
Alabama.....	1,175,035	697,295	477,740	54,305,462	Illinois.....	358,397			17,492,833
California.....	183,525	144,507	39,018	14,464,044	New Jersey.....	113,540			9,247,298
Connecticut.....	50,697	(1)	(1)	7,133,473	New York.....	135,808			8,922,391
Delaware.....	72,591	(1)	(1)	6,593,980	Ohio.....	385,585			20,300,811
Illinois.....	2,610,461	1,867,787	742,674	157,026,544	Pennsylvania.....	1,282,495			75,514,122
Indiana.....	3,076,015	2,342,797	733,218	192,301,897	All other states.....	602,569			32,948,859
Kentucky.....	261,170	(1)	(1)	16,866,019	Wire rods ready to be drawn or rolled into wire, total.....	2,484,428	582,273	1,902,155	120,738,142
Maryland.....	259,223	(1)	(1)	15,950,237	Illinois.....	319,587	(1)	(1)	15,153,290
Massachusetts.....	212,169	(1)	(1)	13,597,136	Pennsylvania.....	1,048,478	231,195	817,283	54,876,918
Michigan.....	20,327	(1)	(1)	5,556,637	All other states.....	1,116,363	(1)	(1)	56,707,034
Missouri.....	117,530	(1)	(1)	11,113,366	Cold-rolled, cold-drawn, cold-hammered, or polished, total.....	145,697	141,986	3,711	17,682,981
New Jersey.....	208,727	(1)	(1)	31,952,787	Pennsylvania.....	111,387	109,559	1,828	10,990,134
New York.....	1,075,969	989,618	86,351	92,243,134	All other states.....	34,310	32,427	1,883	6,692,847
Ohio.....	8,956,138	4,678,179	4,279,959	554,496,299	Rolled wire rods in coils or bars of crucible or electric steel, total.....	15,358	11,044	4,314	4,767,443
Pennsylvania.....	10,135,537	10,537,811	5,697,723	1,114,064,273	Bolt and nut rods, etc., total.....	192,445	10,447	151,998	12,449,618
West Virginia.....	829,173	227,806	601,277	62,143,716	New York.....	11,894	(1)	(1)	1,206,664
Wisconsin.....	214,204	214,204		19,196,599	Pennsylvania.....	87,746	(1)	(1)	6,578,012
All other states.....	753,456	593,790	159,666	48,206,943	All other states.....	62,835	(1)	(1)	4,664,942
A. Finished rolled products and forging, total.....	25,512,847	17,343,747	8,169,100	1,859,457,051	Spike, chain and horseshoe nail rods, total.....	70,475			2,884,130
Alabama.....	689,109	546,710	142,399	35,370,832	Pennsylvania.....	30,994			1,239,790
California.....	144,490	105,472	39,018	9,962,420	All other states.....	39,481			1,644,370
Connecticut.....	47,161	(1)	(1)	6,372,218	Plates (No. 12 and thicker, not coated):				
Delaware.....	64,148	(1)	(1)	4,978,770	Crucible plate steel, total.....	68,434			4,061,617
Illinois.....	1,650,308	1,314,204	336,104	102,834,806	Pennsylvania.....	2,167			427,438
Indiana.....	2,057,267	2,095,756	561,511	169,171,348	All other states.....	66,267			4,524,179
Kentucky.....	80,290	(1)	(1)	7,028,670	Saw plates, total.....	8,668			3,561,306
Maryland.....	198,872	(1)	(1)	12,483,762	Pennsylvania.....	4,669			1,907,453
Massachusetts.....	187,636	(1)	(1)	11,061,012	All other states.....	3,899			1,553,913
Michigan.....	2,077	(1)	(1)	304,809	Boiler or other plate, total.....	4,349,096	3,729,003	620,093	287,411,042
Missouri.....	89,057	(1)	(1)	5,802,049	California.....	30,984	(1)	(1)	1,628,751
New Jersey.....	180,472	(1)	(1)	25,736,214	Indiana.....	466,366	(1)	(1)	32,665,230
New York.....	936,785	850,510	86,275	80,057,749	Ohio.....	584,003	579,222	4,781	38,083,045
Ohio.....	4,984,114	2,790,559	2,193,555	373,347,364	Pennsylvania.....	2,590,517	2,172,310	427,207	169,714,788
Pennsylvania.....	12,143,217	8,330,740	3,812,477	909,590,168	All other states.....	670,126	(1)	(1)	46,419,228
West Virginia.....	685,529	191,781	493,748	53,779,687	Sheets (No. 13 and thinner) black or common:				
All other states.....	772,315	(1)	(1)	51,561,173	Plain, total.....	2,293,193	1,454,734	838,450	227,697,398
Rails:					Indiana.....	218,330	(1)	(1)	20,801,245
Open-hearth steel, total.....	1,893,141			82,644,646	Ohio.....	1,091,693	640,192	442,401	105,023,855
Pennsylvania.....	413,507			18,845,228	Pennsylvania.....	724,191			75,432,503
All other states.....	1,479,634			63,799,418	West Virginia.....	101,221	55,584	45,637	10,867,761
Bessemer, total.....	195,967			10,204,835	All other states.....	157,858	(1)	(1)	10,082,034
Rerolled or renewed rails, total.....	95,637			4,738,883	Black for tinning, total.....	1,084,175	7,107	1,077,068	94,456,189
Rail joints and fastenings, tie-plates, fishplates, etc., total.....	462,691			27,595,921	Ohio.....	190,094	(1)	(1)	10,713,092
Pennsylvania.....	127,913			8,233,201	Pennsylvania.....	497,009	1,096	495,978	43,418,357
All other states.....	334,778			19,362,720	West Virginia.....	253,343	(1)	(1)	21,965,666
Structural shapes, total.....	2,526,461			151,970,064	All other states.....	143,669			12,359,074
(3" or over, leg or web) heavy.....	2,206,820				Skelp, total.....	2,580,064	379,271	2,209,793	151,557,342
(Less than 3", leg or web) light.....	319,641				Ohio.....	1,281,747	176,014	1,105,733	74,905,772
Pennsylvania.....	1,795,687			106,383,147	Pennsylvania.....	993,026	166,387	827,539	59,130,392
All other states.....	730,774			45,586,917	West Virginia.....	188,130	(1)	(1)	10,043,185
Steel bars (merchant, mill shafting, etc., other than reinforced concrete), total.....	4,026,448	3,654,217	372,231	326,764,200	All other states.....	125,261	(1)	(1)	7,477,993
Illinois.....	233,545	(1)	(1)	16,385,391	Cotton ties, total.....	42,681			3,509,492
Indiana.....	459,306	(1)	(1)	30,174,553	Hoops, bands, and strips:				
New Jersey.....	33,090	(1)	(1)	7,698,959	Hoop, band or scroll, black, total.....	595,020			40,902,829
New York.....	295,778	(1)	(1)	36,425,335	Pennsylvania.....	320,987			25,115,678
Ohio.....	1,057,578	999,091	58,487	88,899,972	All other states.....	268,033			21,787,161
Pennsylvania.....	1,630,799	1,461,408	169,291	126,493,404	Steel in strips, flat wire (not exceeding 5" in width or No. 15 wire gauge), total.....	87,002	53,772	33,230	8,767,817
All other states.....	316,343			20,746,646	Pennsylvania.....	24,322	(1)	(1)	2,596,287
Open-hearth or Bessemer.....	3,883,029			264,205,393	All other states.....	62,680	(1)	(1)	6,171,530
Indiana.....	459,306			30,174,553	Other strips.....	100,009	87,804	18,805	10,685,192
New York.....	262,374			16,541,428	Nail and tack plate, total.....	14,337			1,181,535
Ohio.....	1,011,120			75,719,716	Axles, rolled or forged:				
Pennsylvania.....	1,582,225			103,812,403	Car and locomotive, total.....	99,247			9,435,199
All other states.....	567,095			37,957,293	Pennsylvania.....	72,468			7,061,415
Crucible steel.....	33,411			22,780,268	All other states.....	23,779			2,373,784
New York.....	12,306			8,853,625	All other, automobile, carriage, etc., total.....	1,566			317,774
Pennsylvania.....	16,592			11,163,882	Car and locomotive wheels, rolled or forged, total.....	117,763			17,044,728
All other states.....	4,513			2,762,761	Pennsylvania.....	108,997			15,565,085
Electric steel.....	110,008			39,778,599	All other states.....	8,766			1,479,643
New York.....	21,098			11,030,282	Armor plate and ordnance (gun forgings, shells, projectiles, etc.), total.....	101,130			55,699,658
Pennsylvania.....	31,982			11,487,119	Pennsylvania.....	68,964			44,401,072
All other states.....	56,928			17,261,198	All other states.....	32,166			11,298,586
Iron bars, including merchant bars (other than reinforced concrete), total.....	458,549	436,233	22,316	33,796,197	All other rolled steel or iron, total.....	787,475	237,910	549,565	75,686,987
Illinois.....	25,401	(1)	(1)	1,634,718	Illinois.....	62,329	(1)	(1)	5,770,707
Indiana.....	141,165	(1)	(1)	9,315,105	Indiana.....	15,253	15,253		2,044,598
New Jersey.....	18,150	18,150		1,825,701	New York.....	10,724	(1)	(1)	924,489
New York.....	9,243	9,243		949,210	Ohio.....	19,705	14,752	4,953	2,220,436
Pennsylvania.....	140,459	130,619	9,840	11,947,572	Pennsylvania.....	662,355	148,616	513,719	62,290,241
All other states.....	124,131	(1)	(1)	8,123,801	All other states.....	17,120	(1)	(1)	2,436,547
Reinforced concrete bars:					All forged or other iron and steel rolling-mill products, not otherwise enumerated, total.....	309,965	295,551	14,414	38,553,021
Steel, total.....	249,088			14,715,799	Connecticut.....	2,770	2,770		953,841
California.....	36,037			2,763,291	Ohio.....	1,106	1,106		1,137,804
Indiana.....	44,464			2,764,361	Pennsylvania.....	257,639	(1)	(1)	27,886,981
Pennsylvania.....	49,469			2,289,850	All other states.....	48,150	(1)	(1)	8,570,395
All other states.....	119,118			6,898,297					
Iron, total.....	52,365			3,712,996					
Pennsylvania.....	34,658			2,414,380					
All other states.....	17,707			1,298,616					

1 Included in total.

## MANUFACTURES.

TABLE 65.—MATERIALS AND PRODUCTS—DETAILED STATISTICS, BY STATES: 1919—Continued.

[Ton, 2,240 pounds.]

KIND AND STATE.	QUANTITY (TONS),			Value.	KIND AND STATE.	Total	Made and consumed in same works.		For sale or transfer to other establishments.	
	Total.	For sale.	For consumption.				Tons.	Tons.	Tons.	Value.
PRODUCTS—continued.										
C.—Unrolled steel:										
Ingots, total.....	713,027			\$33,315,197	Hammered charcoal blooms, billets, and slabs, total.....	51,477	33,092	17,785		\$920,704
Illinois.....	181,366			9,371,449	Pennsylvania.....	41,057	31,342	9,715		491,308
Ohio.....	92,849			3,049,795	All other states.....	10,420	2,350	8,070		420,396
Pennsylvania.....	243,150			10,102,572	Sheet and tin-plate bars, total.....	4,154,429	1,289,851	2,804,578		117,855,738
All other states.....	195,602			10,791,381	Ohio.....	1,695,065	430,876	1,258,189		53,028,077
Direct steel castings, total.....	720,143			184,644,005	Pennsylvania.....	1,556,620	457,498	1,099,122		44,069,692
California.....	19,863			8,391,891	All other states.....	902,744	395,477	507,267		20,707,999
Illinois.....	79,130			14,081,129	Muck and scrap bar, total.....	906,499	733,609	172,890		10,755,935
Indiana.....	45,520			8,392,932	Illinois.....	34,775	34,775			
Michigan.....	18,218			5,049,375	Indiana.....	135,054	135,054			
New Jersey.....	16,104			5,566,043	New Jersey.....	37,075	37,075			
New York.....	31,509			5,420,280	New York.....	25,769	25,769			
Ohio.....	127,715			22,343,371	Ohio.....	66,958	66,958			
Pennsylvania.....	270,034			47,144,627	Pennsylvania.....	452,881	293,425	159,456		0,899,505
All other states.....	112,050			23,257,354	All other states.....	153,987	140,453	13,534		856,490
		Made and consumed in same works.	For sale or transfer to other establishments.		II. Scrap iron or steel, total.....	11,457,773	9,343,128	2,114,045		37,414,272
					Alabama.....	(1)	(1)	146,858		2,539,857
					California.....	38,897	38,897			
					Delaware.....	(1)	(1)	2,803		63,100
					Illinois.....	628,134	522,168	105,966		1,739,185
					Indiana.....	1,186,526	1,087,099	99,427		1,796,784
					Kentucky.....	(1)	(1)	44,489		(1)
					Massachusetts.....	(1)	(1)	2,267		47,230
					Michigan.....	(1)	(1)	4,182		51,687
					Missouri.....	8,757	8,757			
					New Jersey.....	(1)	(1)	47,587		(1)
					New York.....	443,820	425,013	18,810		316,846
					Ohio.....	2,535,468	2,011,993	523,475		8,299,654
					Pennsylvania.....	5,599,265	4,502,030	1,097,235		20,477,566
					West Virginia.....	121,705	41,781	80,014		1,374,956
					Wisconsin.....	(1)	(1)	5,816		(1)
					All other states.....	(1)	(1)	(1)		(1)
B.—Semi-finished rolled products, total.....										
Illinois.....	699,657			30,739,190	III. All other steel or iron products, not rolled, including value added by further manufacture.					
Indiana.....	373,228			14,737,617	Value.	\$345,902,346	IV. All products, other than steel or iron.....			
Kentucky.....	159,138			8,010,839	Alabama.....	7,285,026	Illinois.....			
New York.....	102,893			4,856,693	California.....	3,538,574	Indiana.....			
Ohio.....	3,751,460			165,755,769	Connecticut.....	2,030,932	Maryland.....			
Pennsylvania.....	3,478,636			147,217,908	Illinois.....	14,035,849	Massachusetts.....			
All other states.....	700,918			28,278,309	Indiana.....	4,685,103	New Jersey.....			
Blooms, billets and slabs, steel, total.....	25,368,210	19,344,186	6,024,044	249,894,063	Kentucky.....	1,253,075	New York.....			
Illinois.....	1,727,160	1,310,527	410,633	19,008,642	Massachusetts.....	17,238,441	Ohio.....			
Indiana.....	2,093,352	1,744,885	288,467	11,834,324	Michigan.....	2,204,271	Pennsylvania.....			
Kentucky.....	134,975	44,875	90,100	4,467,484	Missouri.....	1,423,701	West Virginia.....			
New York.....	855,458	811,702	43,756	2,129,893	New Jersey.....	42,367,831	All other states.....			
Ohio.....	6,411,119	3,963,856	2,447,263	100,017,956	New York.....	7,760,900	Custom work and repair- ing.....			
Pennsylvania.....	11,491,537	9,312,290	2,179,257	90,991,534	Ohio.....	58,243,392	Michigan.....			
All other states.....	2,714,609	2,150,541	564,068	21,454,250	Pennsylvania.....	144,129,876	Ohio.....			
Roller blooms and billets for forging, total.....	310,854	124,321	186,533	10,669,833	West Virginia.....	21,277,842	Pennsylvania.....			
Illinois.....	31,771		31,771	1,674,157	All other states.....	18,487,483	All other states.....			
Ohio.....	(1)		45,508	2,709,738			Michigan.....			
Pennsylvania.....	110,007	78,921	31,086	1,775,867			Ohio.....			
All other states.....	(1)	(1)	78,168	4,610,073			Pennsylvania.....			

1 Included in total.

## GENERAL TABLES.

Comparative summary, by states.—Table 66 shows, by states, for 1919, 1914, and 1909 the number of establishments, average number of wage earners, primary horse-

power, wages, cost of materials, and value of products.

Detailed statement, by states.—Table 67 gives, for 1919, the detailed statistics of the industry, by states.

TABLE 66.—COMPARATIVE STATISTICS, BY STATES: 1919, 1914, AND 1909.

STATE.	Cen- sus year.	Num- ber of estab- lish- ments	Wage earn- ers (aver- age num- ber).	Primary horse- power.	Wages.	Cost of mate- rials.	Value of prod- ucts.	STATE.	Cen- sus year.	Num- ber of estab- lish- ments	Wage earn- ers (aver- age num- ber).	Primary horse- power.	Wages.	Cost of mate- rials.	Value of prod- ucts.
Expressed in thousands.								Expressed in thousands.							
United States.....	1919	500	375,088	3,820,917	\$337,037	\$1,080,576	\$2,828,902	Missouri.....	1910	5	2,047	7,426	\$3,045	\$5,601	\$12,537
	1914	427	243,718	2,703,558	183,142	590,820	913,695		1914	3	1,237	7,062		1,887	3,363
	1909	446	240,070	2,100,978	103,201	557,501	985,723		1909	4	2,227	6,255	1,320	2,859	5,013
California.....	1919	8	3,476	22,838	6,359	9,609	18,192	New Jersey.....	1919	16	13,811	81,600	17,085	34,327	74,382
	1914	7	1,244	6,833	1,050	2,678	4,214		1914	15	4,639	30,971	2,969	5,185	10,420
	1909	5	1,038	3,945	829	2,343	3,520		1909	16	4,671	20,699	2,823	6,035	12,014
Delaware.....	1919	6	1,009	13,442	1,527	3,862	7,115	New York.....	1919	30	17,901	242,352	28,837	54,816	100,593
	1914	5	818	3,645	454	932	1,669		1914	24	10,738	149,462	7,664	18,217	32,078
	1909	5	710	4,912	416	1,059	1,715		1909	25	10,091	130,456	6,323	25,889	30,532
Illinois.....	1919	32	20,177	242,227	34,904	100,319	173,345	Ohio.....	1919	88	73,025	865,036	137,281	381,060	626,370
	1914	25	15,408	178,709	12,068	39,938	64,995		1914	70	46,397	642,958	88,004	139,076	205,023
	1909	24	17,584	152,470	12,062	56,244	85,608		1909	75	38,586	515,813	28,614	139,243	197,780
Indiana.....	1919	23	22,362	278,832	41,204	113,194	199,273	Pennsylvania.....	1919	108	171,715	1,521,731	208,725	777,473	1,296,412
	1914	19	11,106	88,724	9,020	37,037	53,883		1914	178	131,955	1,270,642	96,920	285,382	448,106
	1909	17	12,255	111,806	8,390	20,009	33,052		1909	189	126,911	890,440	85,113	329,013	500,344
Kentucky.....	1919	5	1,892	41,539	2,682	12,714	18,319	West Virginia.....	1919	20	11,630	80,231	19,093	50,704	85,036
	1914	6	1,937	34,405	1,279	7,155	9,078		1914	15	5,348	63,002	4,820	14,668	21,186
	1909	7	2,372	20,640	1,273	5,561	7,779		1909	16	5,060	40,508	3,887	15,896	22,435
Massachusetts.....	1919	11	3,684	31,604	5,758	19,236	30,070	Wisconsin.....	1919	12	3,929	27,433	4,329	14,348	28,393
	1914	11	2,889	28,507	1,903	8,802	11,376		1914	12	2,029	15,215	1,293	3,555	6,009
	1909	9	3,115	24,500	1,977	10,032	13,568		1909	14	2,124	10,064	1,409	7,906	10,733
Michigan.....	1919	7	1,455	9,142	2,471	2,902	8,345	All other states.....	1919	41	26,375	355,484	33,287	100,363	149,620
	1914	9	718	4,688	498	871	1,716		1914	28	12,153	175,830	7,725	24,838	40,549
	1909	8	1,183	4,290	661	1,598	2,070		1909	32	12,140	128,180	7,204	27,119	43,360

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TABLE 67.—DETAILED STATEMENT, BY STATES: 1919.

STATE.	Number of establishments.	PERSONS ENGAGED IN THE INDUSTRY.										WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.					EXPENSES.		
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks, etc.			Wage earners.			16 and over.		Under 16.		Capital.	Salaries and wages.			
					Mala.	Fe-male.	Average number.	Number, 15th day of—		Total.	Male.	Fe-male.	Male.	Fe-male.		Officials.	Clerks, etc.		
								Maximum month.	Minimum month.										
United States..	500	421,861	35	9,671	28,304	8,763	375,088	Ja 441,560	Oc 229,469	400,620	396,741	3,695	171	13	Dollars. 2,666,513,417	Dollars. 43,564,408	Dollars. 56,316,012		
Alabama.....	9	9,205	.....	230	686	168	8,121	Ja 8,595	Je 7,720	7,983	7,976	7	.....	.....	69,600,582	945,919	1,124,678		
California.....	8	3,758	.....	91	149	42	3,476	Oc 3,746	Je 3,309	3,452	3,429	22	1	.....	13,700,484	394,369	350,137		
Connecticut.....	7	2,718	.....	66	102	82	2,468	Ja 2,824	Al 2,182	2,713	2,624	72	10	7	9,532,207	295,915	254,421		
Delaware.....	6	1,184	.....	60	81	34	1,009	Ja 1,740	Je 564	1,209	1,209	.....	.....	.....	13,454,780	222,093	123,442		
Illinois.....	32	23,483	.....	935	1,873	498	20,177	Fe 25,795	Oc 13,330	21,706	21,576	124	6	.....	156,775,176	3,769,826	3,941,425		
Indiana.....	23	24,988	.....	562	1,553	511	22,362	Ja 26,083	Oc 16,689	23,719	23,668	49	2	.....	184,292,031	2,332,793	3,706,845		
Kentucky.....	5	2,083	.....	79	96	16	1,892	De 2,062	Se 862	2,727	2,725	2	.....	.....	16,315,062	284,161	161,003		
Maryland.....	5	5,179	.....	79	124	32	4,944	Fe 5,725	My 4,021	5,443	5,360	83	.....	.....	41,734,218	453,401	686,396		
Massachusetts.....	11	4,310	1	204	306	115	3,684	De 4,029	Ap 3,221	3,906	3,831	161	4	.....	21,374,408	605,406	657,183		
Michigan.....	7	1,675	.....	68	118	34	1,455	No 1,675	My 1,110	1,454	1,450	4	.....	.....	10,081,631	311,943	268,358		
Missouri.....	5	2,916	.....	124	94	51	2,647	Fe 3,253	No 2,176	2,484	2,374	91	17	2	15,113,018	390,627	161,785		
New Jersey.....	16	17,142	1	238	2,265	827	13,811	Ja 14,473	Jy 13,351	13,804	13,473	411	10	.....	97,510,778	1,311,324	2,515,915		
New York.....	30	20,360	3	533	1,385	544	17,901	Ja 22,502	Oc 13,391	19,148	18,858	282	8	.....	145,784,654	2,790,293	2,175,879		
Ohio.....	86	80,494	3	1,395	4,618	1,453	73,025	Ja 85,394	Oc 41,747	82,678	81,667	1,010	1	.....	511,271,910	6,504,750	9,988,611		
Pennsylvania.....	198	193,450	25	4,167	13,532	4,011	171,715	Ja 202,630	Oc 145,252	170,303	177,975	1,225	104	4	1,184,263,482	19,478,800	27,390,578		
West Virginia.....	20	12,730	.....	366	543	191	11,630	So 13,210	Oc 7,920	12,604	12,550	144	.....	.....	63,207,124	1,470,026	1,233,426		
Wisconsin.....	12	4,837	.....	130	231	47	3,929	Ja 4,794	My 3,381	4,203	4,192	3	8	.....	27,205,044	705,496	483,349		
All other states <sup>1</sup> .....	20	11,843	2	344	548	107	10,842	.....	.....	11,809	11,804	5	.....	.....	78,299,428	1,262,167	1,087,581		

STATE.	EXPENSES—continued.						Value of products.	Value added by manufacture.	POWER.					Electric horsepower generated in establishments reporting.
	Salaries and wages—Continued.	For contract work.	Rent and taxes.		For materials.				Primary horsepower.					
			Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.			Total.	Steam engines (including turbines).	Internal-combustion engines.	Water power. <sup>2</sup>	Elec-tric (rented). <sup>3</sup>	
United States..	Dollars. 637,637,430	Dollars. 2,963,415	Dollars. 305,434	Dollars. 87,796,777	Dollars. 1,523,610,896	Dollars. 156,934,862	Dollars. 2,823,902,376	Dollars. 1,143,326,618	3,820,917	2,856,556	257,473	9,041	667,847	1,655,499
Alabama.....	9,331,613	.....	12,000	635,267	43,259,090	0,075,385	64,980,154	15,645,679	150,030	87,480	35	.....	62,515	18,845
California.....	6,358,704	6,332	.....	251,548	8,145,662	1,862,873	18,191,989	8,683,454	22,838	3,381	.....	.....	19,457	.....
Connecticut.....	3,097,900	.....	1,715	260,254	3,456,281	785,673	9,653,036	5,341,152	14,890	12,704	.....	.....	2,186	4,724
Delaware.....	1,526,849	.....	.....	179,469	3,265,129	596,486	7,115,083	3,263,468	13,442	12,097	.....	.....	476	6,557
Illinois.....	34,968,071	4,537	11,833	11,730,259	89,840,869	10,478,619	173,344,650	73,025,172	242,227	190,407	24,025	.....	27,795	132,335
Indiana.....	41,203,699	314	31,615	13,823,978	90,222,769	13,971,510	199,273,518	86,079,239	278,832	115,641	113,910	.....	49,281	61,252
Kentucky.....	2,631,861	1,600	2,500	269,330	11,681,483	1,032,208	18,318,600	5,804,999	41,539	33,300	.....	.....	8,290	4,451
Maryland.....	5,429,730	.....	11,345	154,201	13,546,905	1,473,532	19,884,154	4,863,717	47,426	13,630	26,000	.....	2,766	105,078
Massachusetts.....	5,757,624	650	17,383	752,879	17,232,481	2,004,008	30,969,601	11,733,112	31,000	20,995	667	425	9,522	7,285
Michigan.....	2,471,088	.....	12,000	641,542	2,393,307	568,496	8,344,643	5,442,840	9,142	2,710	.....	.....	6,432	405
Missouri.....	3,044,616	50,000	.....	1,908,744	5,101,207	559,415	12,537,067	6,878,445	7,426	4,600	.....	.....	2,825	6,730
New Jersey.....	17,085,061	325,819	5,690	2,067,994	30,404,200	3,922,005	74,382,205	40,055,400	81,600	62,445	20	510	18,025	22,013
New York.....	28,837,249	6,582	12,306	3,159,231	47,413,047	7,403,267	100,592,636	45,776,322	242,352	125,282	6,370	373	103,827	7,743
Ohio.....	137,231,312	2,201,860	8,660	17,895,874	352,138,966	28,920,707	626,370,025	245,310,352	865,036	672,822	20,051	.....	171,563	285,988
Pennsylvania.....	298,725,262	356,221	158,992	24,622,479	708,566,395	68,906,295	1,296,412,070	518,939,380	1,521,781	1,327,903	46,890	70	146,898	869,622
West Virginia.....	19,993,057	.....	.....	3,543,424	47,569,942	3,224,539	85,036,480	34,242,008	80,231	67,592	630	1,333	10,676	41,366
Wisconsin.....	4,328,771	10,000	2,201	4,420,118	13,023,176	1,322,788	28,893,331	14,047,367	27,433	16,125	670	.....	10,638	6,910
All other states <sup>1</sup> .....	15,429,363	.....	17,194	1,471,196	27,349,997	4,416,556	55,173,035	23,406,482	143,133	81,572	17,135	6,330	38,090	42,395

<sup>1</sup> All other states embrace: Colorado, 1 establishment; District of Columbia, 1; Georgia, 1; Iowa, 2; Maine, 1; Minnesota, 2; Oregon, 1; Rhode Island, 3; Tennessee, 1; Texas, 1; Utah, 1; Virginia, 2; and Washington, 3.

<sup>2</sup> Includes water wheels and turbines (irrespective of ownership of water supply), and water motors (operated by water from city mains).

<sup>3</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants).

## TIN PLATE AND TERNEPLATE.

### GENERAL STATISTICS.

**General character of the industry.**—This industry involves the rolling of the black plates and coating with tin or terne mixture, terne mixture being an alloy of tin and lead, the proportion of tin varying from 20 to 25 per cent. The manufacture of the black plates is a rolling-mill operation and most of the coating is done in dipping departments of the mills that roll the plates. At prior censuses, segregated reports were received for the dipping departments of the black-plate rolling mills and these were included along with the reports from the independent tin-plate establishments, and collectively they constituted the tin-plate and terneplate classified industry. At the present census no attempt was made to secure a segregated report for the dipping department of a rolling mill, and the general statistics for the industry here presented refer to the independent mills only and are, therefore, not fully comparable with those for previous censuses. The statistics for specific materials and products, however, are comprehensive for the industry and cover materials and products, irrespective of whether the establishment is a department of a rolling mill and included in the statistics for steel works and rolling mills, or an independent establishment. The present census, however, includes 8 establishments engaged in recoating tinned ware, with products classed as custom work, valued at \$57,536.

**Comparative summary.**—Table 68 summarizes the general statistics for the industry for the census years 1899 to 1919, inclusive, with percentages of increase for the earlier census periods. The percentages of increase are omitted for the period 1914–1919 because of the limitation of the scope of the 1919 census.

**Principal states, ranked by value of products.**—Table 69 gives the general statistics, by states, ranked according to value of products.

**Persons engaged in the industry.**—Table 70 presents the comparative statistics for 1919, 1914, and 1909 for persons engaged in the industry, classified as to their occupational status, sex, and whether over or under 16 years of age. The age classification of the average number of wage earners is an estimate obtained by the method described in the "Explanation of terms."

**Wage earners, by months.**—Table 71 gives the statistics of wage earners, by months, for 1919, 1914, and

1909. Females constituted 13.1 per cent of the total number in 1919. The table affords a view of the fluctuations during the year.

**Prevailing hours of labor.**—Table 72 illustrates the tendency towards shortening the hours of labor. In 1909, 13.6 per cent were in establishments where the prevailing hours of labor per week were 48 or less; in 1914 this proportion increased to 41.8 per cent, and in 1919 to 84.6 per cent. On the other hand, in 1909 33.3 per cent of the wage earners were in establishments where the prevailing hours of labor were in excess of 54 per week, but in 1914 only 7.3 per cent were in establishments of this class, and in 1919 the proportion was reduced still further to 4.8 per cent.

**Size of establishments, by average number of wage earners (Table 73).**—In 1919 the establishments averaged 130 wage earners per establishment, and in 1914, 169; with 35.8 per cent of all wage earners in establishments averaging over 250 wage earners in 1919 and 45.4 per cent in 1914.

**Size of establishments, by value of products.**—A classification based upon value of products is necessarily affected by the high values in 1919. Moreover, the change in the scope of the industry affects comparisons with the census of 1914 and prior years. The establishments averaged \$1,547,000 in value of products at the census of 1909, \$2,205,000 at the census of 1914, and \$4,058,000 at the census of 1919. For 1909, 18 of the 31 establishments reported products in excess of \$1,000,000, aggregating \$42,171,000, or 87.9 per cent of all products for the industry; at the census of 1914, there were 23 similar establishments, with 96.1 per cent of all products; and at the census of 1919, 15, with 99.5 per cent.

**Character of ownership.**—With a few exceptions, the establishments are owned by corporations. Of the 24 establishments in 1919, 16 were corporations with 99.9 per cent of the value of products, and employing 98.9 per cent of the wage earners. The remaining establishments, 8 in number, include 7 individuals and 1 firm, and include the redipping or retinning plants.

**Number and horsepower of types of prime movers.**—Table 74 presents the power equipment statistics for 1919, 1914, and 1909.

**Fuel consumed.**—Table 75 presents the statistics for fuel consumption.

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TABLE 68.—COMPARATIVE SUMMARY: 1919, 1914, 1909, 1904, AND 1899.

	1919 <sup>1</sup>	1914	1909	1904	1899	PER CENT OF INCREASE. <sup>2</sup>		
						1909-1914	1904-1909	1899-1904
Number of establishments.....	23	31	31	36	57	.....	.....	.....
Persons engaged.....	3,686	5,733	5,846	5,132	4,019	-1.9	13.9	27.7
Proprietors and firm members.....	9	4	4	1	15	.....	.....	.....
Salaried employees.....	555	491	490	284	333	.....	72.5	-1.7
Wage earners (average number).....	3,122	5,238	5,352	4,847	3,671	-2.1	10.4	32.0
Primary horsepower.....	18,007	9,355	8,154	8,990	3,515	14.7	-9.3	155.8
Capital.....	\$34,315,066	\$20,847,339	\$10,904,813	\$10,813,239	\$6,650,047	144.2	1.7	62.6
Salaries and wages.....	6,928,403	4,683,117	3,934,794	2,692,624	2,181,240	19.0	46.2	23.4
Salaries.....	1,171,986	758,070	619,920	309,554	291,323	22.4	100.3	6.3
Wages.....	5,756,417	3,924,447	3,314,874	2,383,070	1,889,917	18.0	39.1	26.1
Paid for contract work.....	297	.....	.....	.....	.....	.....	.....	.....
Rent and taxes.....	1,863,352	141,787	54,620	* 30,832	* 33,271	159.6	79.9	-9.9
Cost of materials.....	73,422,649	57,906,561	41,889,434	31,375,714	26,728,150	38.2	33.5	17.0
Value of products.....	97,404,720	68,342,962	47,969,645	35,283,360	31,592,011	42.5	36.0	10.6
Value added by manufacture <sup>4</sup> .....	23,982,071	10,436,401	6,080,211	3,907,046	5,163,801	71.6	55.6	-24.3

<sup>1</sup> Figures not comparable with prior years, which include dipping departments of rolling mills as well as mills operating independently, hence per cent of increase, 1914-1919, is omitted.

<sup>2</sup> A minus sign (-) denotes decrease.

<sup>3</sup> Exclusive of internal revenue.

<sup>4</sup> Value of products less cost of materials.

TABLE 69.—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
		Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.
United States.....	24	3,122	100.0	.....	\$97,405	100.0	.....	\$23,982	100.0	.....
Pennsylvania.....	11	2,005	64.2	1	58,816	60.4	1	14,061	58.6	1
Ohio.....	3	263	8.4	4	9,197	9.4	4	2,523	10.5	4
All other states.....	10	854	27.4	.....	29,392	30.2	.....	7,398	30.9	.....

TABLE 70.—PERSONS ENGAGED IN THE INDUSTRY: 1919, 1914, AND 1909.

CLASS.	Cen-sus year.	Total.	Male.	Fe-male.	PER CENT OF TOTAL.		CLASS.	Cen-sus year.	Total.	Male.	Fe-male.	PER CENT OF TOTAL.	
					Male.	Fe-male.						Male.	Fe-male.
All classes.....	1919	3,686	3,007	619	83.2	16.8	Clerks and other subordinate salaried employees.	1919	208	173	35	83.2	16.8
	1914	5,733	5,039	694	87.9	12.1		1914	403	330	73	81.0	18.1
	1909	5,846	5,275	571	90.2	9.8		1909	396	320	76	80.8	19.2
Proprietors and officials.....	1919	356	181	175	50.9	49.1	Wage earners (average number).....	1919	3,122	2,713	409	86.9	13.1
	1914	92	92	.....	100.0	.....		1914	5,238	4,617	621	88.1	11.9
	1909	98	98	.....	100.0	.....		1909	5,352	4,857	495	90.8	9.2
Proprietors and firm members.....	1919	9	0	.....	100.0	.....	16 years of age and over.....	1919	3,118	2,709	409	86.8	13.2
	1914	4	4	.....	100.0	.....		1914	5,219	4,598	621	88.1	11.9
	1909	4	4	.....	100.0	.....		1909	5,322	4,827	495	90.7	9.3
Salaried officers of corporations.....	1919	9	9	.....	100.0	.....	Under 16 years of age.....	1919	4	4	.....	100.0	.....
	1914	24	24	.....	100.0	.....		1914	19	19	.....	100.0	.....
	1909	20	20	.....	100.0	.....		1909	30	30	.....	100.0	.....
Superintendents and managers.....	1919	338	163	175	48.2	51.8							
	1914	64	64	.....	100.0	.....							
	1909	74	74	.....	100.0	.....							

## MANUFACTURES.

TABLE 71.—WAGE EARNERS, BY MONTHS, FOR STATES: 1919.

[The month of maximum employment is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
United States:														
1919.....	3,122	3,487	3,880	3,641	2,810	2,006	<b>2,567</b>	3,442	3,607	3,008	2,471	2,859	3,286	61.0
Males.....	2,713	3,041	3,370	3,166	2,445	2,285	<b>2,105</b>	3,001	3,119	2,588	2,114	2,479	2,843	62.5
Females.....	409	446	510	475	365	321	<b>262</b>	441	488	420	357	380	443	53.7
1914.....	5,238	5,222	5,277	5,686	5,702	5,591	5,580	<b>5,448</b>	4,943	5,427	5,526	4,300	<i>4,154</i>	72.9
1909.....	5,352	4,924	5,137	5,215	5,563	5,621	5,775	<b>4,771</b>	5,079	5,215	5,494	5,692	5,686	82.6
Ohio.....	263	363	392	385	202	312	238	352	440	206	<i>25</i>	45	146	5.7
Pennsylvania.....	2,005	2,196	2,454	2,334	1,851	<i>1,492</i>	1,550	2,134	2,255	1,902	1,683	1,965	2,244	80.8

TABLE 72.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR STATES: 1919 AND 1914.

STATE.	Census year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—						STATE.	Census year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—					
			44 and under.	Between 44 and 48.	48.1	Between 48 and 54.	54.	Between 54 and 60.				44 and under.	Between 44 and 48.	48.1	Between 48 and 54.	54.	Between 54 and 60.
United States.....	1919	3,122	2,640	.....	.....	9	323	134	16	Pennsylvania.....	1919	2,005	1,584	.....	9	323	80
	1914	5,238	(2)	.....	.....	7	2,657	378	6		1914	2,368	(2)	.....	7	1,722	.....
	1909	5,352	(2)	.....	.....	729	2,841	1,503	279								
Ohio.....	1919	263	250	.....	.....	.....	.....	.....	13								
	1914	953	(2)	.....	.....	493	.....	361	88								

<sup>1</sup> Includes 48 and under for 1914 and 1909.<sup>2</sup> Corresponding figures not available.

TABLE 73.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR STATES: 1919.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—													
	Estab-lish-ments.	Wage earners (average number).	No wage earners.	1 to 5 wage earners, inclusive.		6 to 20 wage earners, inclusive.		21 to 50 wage earners, inclusive.		51 to 100 wage earners, inclusive.		101 to 250 wage earners, inclusive.		251 to 500 wage earners, inclusive.		Over 500 wage earners.
			Estab-lish-ments.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.
United States...1919..	24	3,122	1	5	13	2	21	1	44	4	306	8	1,621	3	1,117	.....
1914..	31	5,238	.....	.....	.....	3	23	1	45	6	490	14	2,301	6	1,860	.....
Ohio.....	3	263	.....	.....	.....	1	13	.....	.....	1	64	1	186	.....	1,117	.....
Pennsylvania.....	11	2,005	.....	2	4	1	8	.....	.....	1	86	4	790	3	1,117	.....

TABLE 74.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919, 1914, AND 1909.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.					
	1919	1914	1909	Amount.			Per cent distribution.		
				1919	1914	1909	1919	1914	1909
Primary power, total.....	176	163	32	18,697	9,355	8,154	100.0	100.0	100.0
Owned.....	31	30	29	17,437	7,599	8,137	93.3	81.2	99.8
Steam.....	30	27	27	17,429	7,116	7,937	93.3	76.1	97.3
Engines.....	25	.....	.....	5,213	.....	.....	27.9	.....	.....
Turbines.....	5	.....	.....	5,213	.....	.....	27.9	.....	.....
Internal-combustion engines.....	1	3	2	8	483	200	( <sup>2</sup> )	5.2	2.5
Rented, electric.....	145	133	3	1,260	1,756	17	6.7	18.8	0.2
Electric.....	581	292	102	8,943	3,948	1,147	100.0	100.0	100.0
Rented.....	145	133	3	1,260	1,756	17	14.1	44.5	1.5
Generated by establishments reporting.....	436	159	99	7,683	2,192	1,130	85.9	55.5	98.5

<sup>1</sup> Figures for horsepower include for 1909 the amount reported under the head of "Other" owned power.<sup>2</sup> Less than one-tenth of 1 per cent.



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TABLE 75.—FUEL CONSUMED: 1919.

STATE.	COAL.		Coke (ton, 2,000 pounds).	Fuel oils (barrels).	Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).	STATE.	COAL.		Coke (ton, 2,000 pounds).	Fuel oils (barrels).	Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).
	Anthracite (ton, 2,240 pounds).	Bituminous (ton, 2,000 pounds).						Anthracite (ton, 2,240 pounds).	Bituminous (ton, 2,000 pounds).				
United States..1919..		68,728	7	3,558	20	114,063	Pennsylvania.....	22	42,167		3,558	20	101,269
1914.....		125,742	214	25,000	(1)	1,017,336	West Virginia.....		9,486				11,173
Ohio.....	100	5,340				1,800	All other states.....		11,756	7			721

<sup>1</sup> Included in figures for fuel oils.

## SPECIAL STATISTICS.

**Materials and products.**—The detailed statistics for materials and products include the dipping departments of black-plate mills, as well as the independent establishments that constitute the classified industry, and the material and product figures are comparable with those for prior censuses. Table 76 gives these statistics for 1919, 1914, and 1909. The cost of black plate constituted about 75 per cent, and the cost of coating metals about 20 per cent of the cost of materials in 1919. The corresponding percentages in 1919 were 69 and 23, respectively. The output of all tin and terne plate shows an average unit value of 6.92 cents per pound in 1919 as compared with 3.23 cents in 1914, and 3.48 cents in 1909. The increase in unit value, 1914 to 1919, is in keeping with the increase in material costs, black plates averaging 3.71 cents per pound in 1919, as compared with 1.89 cents in 1914; pig tin, 58 cents in 1919 and 39 cents in 1914; and pig lead, 5.12 cents in 1919 and 4.14 cents in 1914.

The 8 establishments included in the industry for 1919 engaged in redipping or recoating reported consumption of 29,376 pounds of pig tin, costing \$7,660, and products to the value of \$57,536, this amount being included under the item "All other products, including plates redipped, tin dross, scruff, scrap, etc."

TABLE 76.—MATERIALS AND PRODUCTS: 1919, 1914, AND 1909.

	1919	1914	1909
<b>MATERIALS.</b>			
Total cost.....	\$130,273,696	\$57,906,561	\$41,889,434
Tin and terne plate industry, cost.	\$73,422,649	\$57,906,561	\$41,889,434
Tin and terne dipping departments of black-plate mills: Black plates and coating materials, cost.	\$58,851,047		
Black plates, steel: <sup>1</sup>			
Pounds.....	2,630,798,873	2,107,787,589	1,321,071,691
Cost.....	\$99,730,197	\$39,803,655	\$28,981,151
Produced by the establishment reporting—			
Pounds.....	2,593,351,524	2,084,536,669	1,291,048,109
Cost.....	\$98,433,207	\$39,335,112	\$28,245,234
Purchased—			
Pounds.....	37,447,349	23,250,920	30,023,582
Cost.....	\$1,299,990	\$488,543	\$735,917

<sup>1</sup> In 1919, all steel; 1914 includes 6,208,969 pounds of iron plates, valued at \$209,533; and 1909, 8,726,538 pounds, \$96,914.

TABLE 76.—MATERIALS AND PRODUCTS: 1919, 1914, AND 1909—Continued.

	1919	1914	1909
<b>MATERIALS—continued.</b>			
Coating metals:			
Pig tin—			
Pounds.....	43,628,872	36,542,881	28,586,267
Cost.....	\$25,350,062	\$14,167,237	\$8,490,794
Pig lead—			
Pounds.....	1,074,225	2,289,160	2,708,496
Cost.....	\$55,054	\$94,024	\$117,656
Terne mixture (purchased)—			
Pounds.....	7,288,245	6,618,211	9,632,996
Cost.....	\$1,430,586	\$783,540	\$1,061,587
Total tin and lead, including contents of terne mixture purchased, pounds.....	51,991,342	45,430,252	40,927,759
Tin.....	45,271,634	38,049,636	31,077,651
Lead.....	6,719,708	7,380,616	9,850,108
Plates for redipping:			
Pounds.....	348,565	(2)	(2)
Cost.....	\$24,049	(2)	(2)
Fuel and rent of power, cost.....	\$364,180	\$309,924	\$280,675
All other materials, cost.....	\$3,310,559	\$2,748,175	\$2,948,671
<b>PRODUCTS.</b>			
Total value.....	\$180,325,368	\$68,342,962	\$47,969,645
Tin and terneplate industry.....	\$97,404,720	\$68,342,962	\$47,969,645
Dipping departments of black plate mills.....	\$82,920,648		
Tin plate and terneplate: <sup>1</sup>			
Pounds.....	2,539,224,064	2,053,983,144	1,315,313,132
Value.....	\$175,776,283	\$308,270,845	\$45,815,146
Tin plate, steel—			
Pounds.....	2,373,253,628	1,901,331,895	1,123,968,875
Value.....	\$164,958,677	\$300,258,024	\$38,250,885
Coke plate—			
Pounds.....	2,336,703,947	1,855,892,526	(3)
Value.....	\$161,674,698	\$38,450,853	(3)
Charcoal plate—			
Pounds.....	36,540,681	45,439,369	(3)
Value.....	\$3,083,979	\$1,807,171	(3)
Terneplate, including long terne, steel—			
Pounds.....	165,971,036	152,634,249	191,344,257
Value.....	\$10,817,606	\$6,012,321	\$7,555,261
All other products, including plates redipped, tin dross, scruff, scrap, etc., value.....	\$4,549,085	\$2,072,617	\$2,154,499

<sup>1</sup> Figures not available.

<sup>2</sup> In addition, 2 establishments in 1919, 1 in 1914, and 3 in 1909, engaged primarily in other lines of manufacture, made some tin plate and terneplate.

<sup>3</sup> Includes 6,144,890 pounds of iron plate, valued at \$358,828; balance, steel.

**Production, exports, imports, and consumption.**—Table 77 gives comparative statistics of the production, exports, and imports of tin and terne plate for each census year since 1899, together with the figures for quantity retained for consumption. During the period covered by the table imports have fallen from 131,600,000 pounds to almost a vanishing point.



## MANUFACTURES.

TABLE 77.—PRODUCTION, EXPORTS, IMPORTS, AND CONSUMPTION: 1919, 1914, 1909, 1904, AND 1899.

	1919	1914	1909	1904	1899	PER CENT OF INCREASE. <sup>1</sup>			
						1914-1919	1909-1914	1904-1909	1899-1904
Retained for consumption, pounds.....	2,106,977,600	1,954,948,295	1,462,387,570	1,173,329,667	981,297,455	7.8	33.7	24.6	19.0
Of domestic origin, pounds.....	2,106,520,213	1,920,576,896	1,322,209,893	1,015,249,355	849,705,880	9.7	45.3	30.2	19.5
Of foreign origin, pounds.....	457,387	34,371,399	140,177,681	158,080,312	131,591,575	-98.7	-75.5	-11.3	20.1
Per cent of total—									
Domestic.....	99.98	98.2	90.4	86.5	86.6				
Foreign.....	0.02	1.8	9.6	13.5	13.4				
Domestic production, pounds.....	2,564,647,807	2,053,966,144	1,843,103,266	1,032,940,706	850,004,495	24.9	52.9	30.0	21.5
Exports of domestic, pounds.....	458,127,694	133,389,248	20,893,368	17,691,351	208,615	243.5	538.0	18.1	5,824.5
Retained for consumption, pounds.....	2,106,520,213	1,920,576,896	1,322,209,893	1,015,249,355	849,705,880	7.8	45.3	30.2	19.5
Imports, pounds.....	541,912	34,521,171	140,208,441	158,200,762	131,970,441	-98.4	-75.4	-11.4	19.9
Reexports, pounds.....	84,525	149,772	30,780	180,450	378,865	-43.6	387.0	-83.0	-52.4
Retained for consumption, pounds.....	457,387	34,371,399	140,177,681	158,080,312	131,591,575	-98.7	-75.5	-11.3	21.1

<sup>1</sup> A minus sign (-) denotes decrease.

Equipment and capacity.—Table 78 shows the dipping equipment as reported for the census years 1919, 1914, 1909, and 1904. On the basis of 300 working days, the production of plate was approximately equal to two-thirds of full capacity in 1919, compared with 88 per cent in 1914 and 77 per cent in 1909.

TABLE 78.—EQUIPMENT AND CAPACITY: 1919, 1914, 1909, AND 1904.

	1919	1914	1909	1904		1919	1914	1909	1904
UNITED STATES.					UNITED STATES—continued.				
Number of dipping sets at end of year <sup>1</sup> .....	916	603	573	619	Number of establishments operating on: <sup>2</sup>				
Usually employed on tin plate.....	863	615	455	499	Single turn.....	2	6	5	(?)
Usually employed on terne plate.....	48	78	118	120	Double turn.....	3	5	10	.....
					Triple turn.....	30	21	10	.....
Number of building tin or terne sets at end of year.....	60	(?)	(?)	(?)	Daily capacity as operated whether on single, double, or triple turn, pounds.....	18,658,000	10,726,000	7,016,000	(?)
Daily capacity, single turn, pounds <sup>1</sup> .....	6,332,288	3,868,000	2,840,000	3,454,000					
Tin plate.....	5,820,948	3,454,000	2,076,000	2,837,000					
Terneplate.....	511,340	414,000	764,000	567,000					

<sup>1</sup> Includes that of subsidiary establishments.<sup>2</sup> Figures not available.<sup>3</sup> Does not include 8 establishments engaged in retinning only.

## GENERAL TABLES.

Comparative summary, by states.—Table 79 gives the comparative statistics for the principal items, number of establishments, average number of wage earners, primary horsepower, wages, cost of materials, and value of products for the census years 1919, 1914, and 1909.

Detailed statement, by states.—Table 80 is a detailed statement, by states, for the census of 1919.

TABLE 79.—COMPARATIVE SUMMARY, BY STATES: 1919, 1914, AND 1909.

STATE.	Cen- sus year.	Num- ber of estab- lish- ments.	Wage earn- ers (average num- ber).	Pri- mary horse- power.	Wages.	Cost of materials.	Value of products.	STATE.	Cen- sus year.	Num- ber of estab- lish- ments.	Wage earn- ers (average num- ber).	Pri- mary horse- power.	Wages.	Cost of materials.	Value of products.
					Expressed in thousands.								Expressed in thousands.		
United States .	1919	24	3,122	18,697	\$5,766	\$73,423	\$97,405	Pennsylvania.....	1919	11	2,005	16,459	\$3,652	\$44,754	\$58,816
	1914	31	5,238	9,355	3,924	57,907	68,343		1914	13	2,368	4,259	1,785	31,934	36,706
	1909	31	5,352	8,164	3,315	41,889	47,970		1909	17	2,346	1,505	1,339	22,898	25,234
Ohio.....	1919	3	263	232	518	6,673	9,197	All other states.....	1919	10	854	2,006	1,586	21,996	29,392
	1914	7	953	1,330	659	9,443	10,826		1914	11	1,017	3,766	1,480	16,530	20,721
	1909	4	676	1,849	449	7,155	7,889		1909	10	2,330	4,740	1,527	11,836	14,847

# TIN PLATE AND TERNEPLATE.

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TABLE 80.—DETAILED STATEMENT, BY STATES: 1919.

STATE.	Num-ber of estab-lish-ments.	PERSONS ENGAGED IN THE INDUSTRY.								WAGE EARNERS, DEC. 15, OR NEAREST REPRESENTATIVE DAY.						EXPENSES.		
		Total.	Pro-pri-ators and firm mem-bers.	Sala-ried offi-cers, super-in-tend-ants and man-agers.	Clerks, etc.		Wage earners.			Total.	16 and over.		Under 16.		Capital.	Salaries and wages.		
					Male.	Fe-male.	Aver-age num-ber.	Number, 15th day of—			Male.	Fe-male.	Male.	Fe-male.		Officials.	Clerks, etc.	
								Maximum month.	Minimum month.									
United States..	24	3,680	9	347	173	35	3,122	Fe 3,880	Je 2,367	3,537	3,077	485	5	.....	\$34,315,066	\$613,072	\$558,914	
Ohio.....	3	315	1	19	24	8	263	Au 440	Oc 25	416	354	62	.....	.....	2,620,016	60,482	46,011	
Pennsylvania.....	11	2,342	4	269	64	.....	2,005	Fe 2,454	My 1,492	2,250	1,957	297	5	.....	20,418,077	357,184	348,068	
All other states <sup>1</sup> .....	10	1,029	4	59	85	27	854	.....	.....	892	766	126	.....	.....	11,270,973	195,406	163,935	

STATE.	EXPENSES—continued.						Value of products.	Value added by manufac-ture.	POWER.					Electric horse-power gener-ated in es-tablish-ments report-ing.
	Salaries and wages—Con.	For con-tract work.	Rent and taxes.		For materials.				Primary horsepower.					
			Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.			Total.	Steam engines.	Internal-com-bus-tion en-gines.	Water wheels and mo-tors.	Elec-tric (rent-ed). <sup>2</sup>	
United States..	\$5,756,417	\$297	\$5,425	\$1,857,927	\$73,058,460	\$304,189	\$97,404,720	\$23,682,071	18,697	17,429	8	.....	1,260	7,083
Ohio.....	518,321	.....	3,600	228,797	6,657,974	15,145	9,196,593	2,523,474	232	230	.....	.....	2	153
Pennsylvania.....	3,651,974	.....	430	1,030,974	44,438,214	266,221	58,815,616	14,061,181	16,459	16,448	8	.....	3	6,596
All other states <sup>1</sup> .....	1,586,122	297	1,395	598,156	21,912,272	82,823	29,392,511	7,397,416	2,006	751	.....	.....	1,255	944

<sup>1</sup> All other states embrace: California, 1 establishment; Indiana, 2; Minnesota, 1; New York, 1; West Virginia, 4; and Wisconsin, 1.

<sup>2</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants).

# WIRE.

## GENERAL STATISTICS.

**General character of the industry.**—The statistics for the wire industry as here presented comprise: (1) Independent wire-drawing mills, the same constituting the classified industry; (2) the wire-drawing departments of steel works and rolling mills, the general statistics for which are included in the report for the rolling mills; and (3) wire-drawing departments of establishments engaged primarily in other lines of manufacture, especially brass and copper rolling mills, which are included in the industry to which their chief products relate.

Statistics relating to capital, labor, and other general items can not be segregated for the wire departments of rolling mills, that is for establishments of the second and third classes, and hence are not included in the general statistics for the industry; but the special statistics for materials and products are comprehensive for the industry, and cover same, irrespective of whether the establishment is a department of a rolling mill or an independent wire-drawing mill. The unit of quantity used is the short ton of 2,000 pounds.

**The industry as a whole.**—Table 81 is a summary of the three classes of wire-drawing mills for 1919, 1914, and 1909, showing the number of establishments and value of products, with per cent of increase for the intervening census periods. There were 108 wire-drawing establishments in 1919 compared with 99 in 1914 and 93 in 1909. Classified according to metals there were in 1919, 74 establishments that drew iron and steel wire; 30, copper wire; 22, brass; 7, nickel silver; 5, bronze; 2 each, aluminum, copper clad, nickel or nickel alloy, and phosphor bronze; and 1 each, German silver, monel metal, resistance compound, and zinc-copper.

**Comparative summary.**—Table 82 is a summary of the general statistics for the classified industry for the censuses of 1919, 1914, and 1909. Figures for previous census years do not give a correct view of the growth of the industry, and are therefore omitted.

**Principal states, ranked by value of products.**—Table 83 gives the general statistics, by states, ranked according to value of products.

**Persons engaged in the industry.**—Table 84 presents the comparative statistics for 1919, 1914, and 1909, classified by occupational status, sex, and age. The age classification of the average number of wage earners is an estimate obtained by the method described in the "Explanation of terms."

**Wage earners, by months.**—In Table 85 are shown the wage earners in the industry in 1919, 1914, and 1909; and for 1919, by states, and by months. In certain states, notably Ohio, Illinois, and New York, there were marked variations in number of wage earners as between the minimum and maximum months.

**Prevailing hours of labor.**—Comparative statistics of wage earners, classified according to prevailing hours of labor per week, are given in Table 86. In 1909, 57.4 per cent of the wage earners were employed in establishments where the prevailing hours of labor per week were 60 or more, but with the movement towards shortening the hours of labor, this proportion in 1914 dropped to 43.4 per cent and in 1919 to 29.4 per cent. On the other hand, in 1909 no wage earners were reported for establishments where the prevailing hours of labor per week were 48 or less, but in 1914, 3.8 per cent were so reported, and in 1919, 4.7 per cent.

**Size of establishments, by average number of wage earners.**—In 1919 the average number of wage earners per establishment was 299 and in 1914, 326. The industry, as shown in Table 87, is of relatively large units, and in 1919 there were 28 establishments that employed over 250 wage earners per establishment, the wage earners representing 88 per cent of all for the industry; in 1914, 22 establishments, with 84.5 per cent of all wage earners, were of this character.

**Size of establishments, by value of products.**—Statistics for establishments, ranked by value of products, are given in Table 88. The average value of products per establishment in 1909 was approximately \$1,509,000 and in 1914 \$1,516,000, with an increase to \$2,457,000 in 1919, largely due to advance in values. One-half of the establishments in 1919 reported products in excess of \$1,000,000, the aggregate value for these establishments constituting 93.7 per cent of the total value of products for the industry.

**Character of ownership.**—Of the 66 establishments engaged in the wire-drawing industry in 1919, 58 were owned by corporations, 4 by individuals, and 4 were of the "All others" class, chiefly firms. The "Corporations" group reported 98.7 per cent of the wage earners and 99.2 per cent of the value of products.

**Number and horsepower of types of prime movers.**—Table 89 gives the statistics for power used in the industry in 1919, 1914, and 1909. Rented or purchased electric power is an important factor, and forms nearly one-half of the primary power reported for the industry. In addition, the establishments generate electric power to a very considerable extent, and of the total power, 72.5 per cent was utilized in the form of electric power in 1919, this including purchased electric power and that generated by the establishment. In 1914 the proportion of primary power utilized in the form of electric energy was 47 per cent, and in 1909, 26 per cent.

**Fuel consumed.**—Fuel statistics are presented in Table 90. Gas includes both natural and manufactured gas.

TABLE 81.—THE INDUSTRY AS A WHOLE: 1919, 1914, AND 1909.

	NUMBER OF ESTABLISHMENTS.			VALUE OF PRODUCTS.			PER CENT OF INCREASE. <sup>1</sup>	
	1919	1914	1909	1919	1914	1909	1914-1919	1909-1914
Total.....	108	90	93	\$392,601,073	\$172,600,540	\$180,083,522	127.5	-4.2
Wire and manufactures of wire.....				384,019,118	166,999,888	173,349,614	130.5	-3.7
(1) Wire mills.....	60	54	56	157,513,598	78,150,487	70,249,899	101.6	-1.4
(2) Wire departments of iron and steel rolling mills.....	27	24	23	204,184,070	73,092,790	77,470,814	179.5	-5.7
(3) Brass and copper rolling mills and other concerns.....	15	21	14	23,221,444	15,786,611	16,628,631	47.1	-5.1
All other products.....				7,681,955	5,600,658	6,733,908	37.2	-16.8

<sup>1</sup> A minus sign (-) denotes decrease.

TABLE 82.—COMPARATIVE SUMMARY: 1919, 1914, AND 1909.

	WIRE MILLS USING PURCHASED RODS.			PER CENT OF INCREASE. <sup>1</sup>			WIRE MILLS USING PURCHASED RODS.			PER CENT OF INCREASE. <sup>1</sup>	
	1919	1914	1909	1914-1919	1909-1914		1919	1914	1909	1914-1919	1909-1914
Number of establishments.....	68	54	56	.....	.....	Salaries and wages.....	\$34,744,073	\$13,999,097	\$12,515,070	148.2	11.9
Person engaged.....	22,236	10,740	10,945	12.0	-1.0	Salaries.....	5,464,406	2,978,278	2,199,348	83.1	35.4
Proprietors and firm members.....	13	18	15	.....	.....	Wages.....	28,289,667	11,020,720	10,315,722	165.8	6.8
Salaried employees.....	2,482	2,122	1,840	17.0	15.0	Paid for contract work.....	774,423	17,410	6,510	4,384.2	167.4
Wage earners (average number).....	19,741	17,600	18,084	12.2	-2.7	Rent and taxes.....	3,590,531	745,481	241,688	382.4	208.5
Primary horsepower.....	110,451	83,940	71,950	42.3	16.6	Cost of materials.....	102,813,691	56,424,404	60,542,931	82.2	-6.8
Capital.....	\$102,016,777	\$64,013,668	\$60,157,073	59.4	6.4	Value of products.....	162,151,236	81,841,012	84,486,518	98.1	-3.1
						Value added by manufacture <sup>2</sup> .....	59,337,645	25,416,518	23,943,637	133.5	0.1

<sup>1</sup> A minus sign (-) denotes decrease.<sup>2</sup> Value of products less cost of materials.

TABLE 83.—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.			STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
		Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.			Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.
United States..	68	19,741	100.0	....	\$162,151	100.0	....	\$59,338	100.0	...	New Jersey.....	7	1,923	9.7	5	\$10,878	12.2	3	\$5,179	8.7	5
Illinois.....	10	2,775	14.1	2	29,855	18.4	1	11,408	19.2	2	Pennsylvania.....	11	2,203	11.2	4	19,596	12.1	4	5,379	9.1	6
Massachusetts.....	9	5,203	22.4	1	24,552	15.1	2	12,679	21.4	1	Connecticut.....	7	1,378	7.0	7	9,083	5.6	8	4,480	7.5	7
											All other states.....	22	6,269	33.0	....	59,187	36.6	....	20,213	34.1	...

TABLE 84.—PERSONS ENGAGED IN WIRE MILLS USING PURCHASED RODS: 1919, 1914, AND 1909.

CLASS.	Cen-sus year.	Total.	Male.	Fe-male.	PER CENT OF TOTAL.		CLASS.	Cen-sus year.	Total.	Male.	Fe-male.	PER CENT OF TOTAL.	
					Male.	Fe-male.						Male.	Fe-male.
All classes.....	1919	22,236	20,031	1,605	92.8	7.2	Clerks and other subordinate salaried employees.....	1919	1,883	1,295	588	68.2	31.2
	1914	19,740	18,682	1,058	94.6	5.4		1914	1,695	1,352	343	79.8	20.2
	1909	19,945	18,904	1,041	94.8	5.2		1909	1,462	1,240	222	81.8	15.2
Proprietors and officials.....	1919	612	605	7	98.9	1.1	Wage earners (average number).....	1919	19,741	18,731	1,010	94.8	5.2
	1914	445	438	7	98.4	1.6		1914	17,600	16,892	708	96.0	4.0
	1909	399	395	4	99.0	1.0		1909	18,034	17,269	815	95.5	4.5
Proprietors and firm members.....	1919	13	12	1	92.3	7.7	16 years and over.....	1919	19,670	18,682	988	95.0	5.0
	1914	18	14	4	77.8	22.2		1914	17,590	16,884	706	96.0	4.0
	1909	15	13	2	86.7	13.3		1909	17,992	17,190	802	95.5	4.5
Salaried officers of corporations...	1919	122	119	3	97.5	2.5	Under 16 years of age.....	1919	71	49	22	69.0	31.0
	1914	76	74	2	97.4	2.6		1914	10	8	2	80.0	20.0
	1909	78	77	1	98.7	1.3		1909	92	79	13	85.9	14.1
Superintendents and managers...	1919	477	474	3	99.4	0.6							
	1914	351	350	1	99.7	0.3							
	1909	306	305	1	99.7	0.3							

## MANUFACTURES.

TABLE 85.—WAGE EARNERS, BY MONTHS, FOR WIRE MILLS USING PURCHASED RODS, FOR SELECTED STATES: 1919.

(The month of maximum employment is indicated by bold-faced figures and that of minimum employment by *italic* figures.)

STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
United States:														
1919.....	19,741	21,043	20,868	19,993	19,038	18,988	18,056	19,838	21,016	21,282	<i>17,355</i>	18,796	20,030	81.5
Males.....	18,731	19,864	19,592	18,905	18,162	18,135	17,845	18,935	19,997	20,281	<i>16,366</i>	17,759	18,951	80.6
Females.....	1,010	1,179	1,276	1,088	876	853	811	903	1,019	1,001	979	1,037	1,088	83.6
1914.....	17,600	18,483	18,733	18,816	18,363	17,864	17,575	17,200	17,006	17,329	17,207	16,369	<i>16,266</i>	80.4
1909.....	18,084	17,763	18,147	17,604	17,181	17,432	17,862	17,864	17,673	18,206	18,530	19,091	19,641	87.2
Connecticut.....	1,378	1,531	1,593	1,244	<i>1,069</i>	1,095	1,139	1,454	1,492	1,513	1,468	1,558	1,303	66.3
Illinois.....	2,775	3,198	3,129	3,072	2,947	2,883	2,960	3,102	3,309	3,129	<i>1,468</i>	1,887	2,216	44.4
Massachusetts.....	5,203	5,201	5,105	5,089	4,970	4,935	<i>4,910</i>	4,960	5,050	5,238	5,372	5,701	6,905	83.1
New Jersey.....	1,523	2,024	1,902	1,846	1,773	1,717	1,776	1,891	1,984	2,033	2,066	2,007	2,057	83.1
Pennsylvania.....	2,203	2,208	2,105	2,109	2,011	2,041	2,194	2,372	2,469	2,464	<i>2,006</i>	2,179	2,299	81.2

TABLE 86.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR SELECTED STATES: 1919 AND 1914.

STATE.	Cen- sus year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—							STATE.	Cen- sus year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—							
			44 and under.	Be- tween 44 and 48.	48. <sup>1</sup>	Be- tween 48 and 54.	54.	Be- tween 54 and 60.	60.				Over 60.	44 and under.	Be- tween 44 and 48.	48. <sup>1</sup>	Be- tween 48 and 54.	54.	Be- tween 54 and 60.	60.
United States.	1919	19,741	98	53	788	1,725	2,318	8,978	3,447	2,354	1914	17,600	(2)	(2)	660	4,399	333	4,561	6,824	817
	1909	18,084	(2)	(2)	.....	76	1	7,026	10,232	149										
Connecticut.....	1919	1,378	.....	.....	435	5	.....	938	.....	.....	1914	786	.....	.....	.....	.....	.....	.....	.....	.....
	1914	786	.....	.....	.....	.....	.....	382	404	.....			.....	.....	.....	.....	.....	.....	.....	.....
Illinois.....	1919	2,775	.....	.....	296	.....	15	216	1,388	800	1914	2,763	(2)	(2)	655	.....	1,038	816	.....	254
	1914	2,763	.....	.....	.....	.....	.....	.....	.....	.....			.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts.....	1910	5,203	.....	.....	.....	.....	.....	.....	.....	.....	1914	2,899	.....	.....	493	.....	4,710	.....	.....	.....
	1914	2,899	.....	.....	.....	.....	.....	.....	.....	.....			.....	.....	.....	.....	870	.....	.....	2,020
New Jersey.....	1919	1,923	.....	.....	.....	.....	.....	.....	.....	.....	1914	5,821	.....	53	.....	60	784	1,020	.....	.....
	1914	5,821	.....	.....	.....	.....	.....	.....	.....	.....			.....	.....	4,396	.....	1,299	.....	.....	126
Pennsylvania.....	1919	2,203	.....	.....	.....	.....	.....	.....	.....	.....	1914	1,248	90	(2)	14	.....	52	316	960	771
	1914	1,248	.....	.....	.....	.....	.....	.....	.....	.....			.....	.....	.....	35	622	.....	.....	14

1 Includes 48 and under for 1914 and 1909.

2 Figures not available.

TABLE 87.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR SELECTED STATES: 1919.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—																	
	Establishments.	Wage earners (average number).	No wage earners.		1 to 5 wage earners, inclusive.		6 to 20 wage earners, inclusive.		21 to 50 wage earners, inclusive.		51 to 100 wage earners, inclusive.		101 to 250 wage earners, inclusive.		251 to 500 wage earners, inclusive.		501 to 1,000 wage earners, inclusive.		Over 1,000 wage earners.	
			Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.
United States.... 1919..	66	19,741	1	5	14	9	109	3	102	12	825	8	1,355	15	5,301	10	7,155	3	4,880	
1914..	54	17,000	.....	4	8	5	71	7	274	3	249	13	2,124	14	5,094	5	2,936	.....	0,844	
Connecticut.....	7	1,378	1	1	5	.....	.....	1	21	1	73	.....	.....	2	733	1	546	.....	.....	
Illinois.....	10	2,775	.....	.....	.....	1	15	.....	.....	1	.....	.....	.....	2	1,537	1	705	.....	.....	
Massachusetts.....	9	5,203	.....	.....	.....	2	26	1	45	2	166	2	292	4	1,537	1	711	.....	.....	
New Jersey.....	7	1,923	.....	1	1	.....	.....	.....	.....	2	117	1	114	1	298	2	1,393	2	3,771	
Pennsylvania.....	11	2,203	.....	.....	.....	3	42	.....	.....	3	191	2	383	2	627	1	960	.....	.....	

TABLE 88.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919, 1914, AND 1909.

VALUE OF PRODUCT.	NUMBER OF ESTABLISHMENTS.			AVERAGE NUMBER OF WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
	1919	1914	1909	1919	1914	1909	1919	1914	1909	1919	1914	1909
All classes.....	66	54	50	19,741	17,600	18,084	\$102,151,236	\$81,841,012	\$94,480,518	\$59,337,645	\$25,410,518	\$23,943,587
Less than \$5,000.....	5	3	4	12	17	12	60,528	29,983	36,337	22,935	10,760	15,769
\$5,000 to \$20,000.....	7	9	5	68	161	108	424,879	477,697	259,017	188,221	213,741	91,282
\$20,000 to \$100,000.....	12	12	30	616	3,223	4,659	3,060,822	4,367,664	14,775,545	1,357,224	3,957,119	5,102,294
\$100,000 to \$500,000.....	9	9		947			6,666,632	6,502,043		2,838,139		
\$500,000 to \$1,000,000.....	33	21	17	18,098	14,199	13,305	151,938,375	70,463,625	69,415,619	54,931,126	21,234,808	18,734,252
\$1,000,000 and over.....												
PER CENT DISTRIBUTION.												
All classes.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than \$5,000.....	7.6	5.5	7.1	0.1	0.1	0.1	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	0.1
\$5,000 to \$20,000.....	10.6	16.7	8.9	0.3	0.9	0.6	0.3	0.6	0.3	0.3	0.8	0.4
\$20,000 to \$100,000.....	18.2	22.2	53.6	3.1	18.3	25.8	1.9	5.3	17.5	2.3	15.6	21.3
\$100,000 to \$500,000.....	13.6	16.7		4.8			4.1	6.0		4.8		
\$500,000 to \$1,000,000.....	50.0	38.9	30.4	91.7	80.7	73.6	93.7	86.1	82.2	92.6	83.6	78.2
\$1,000,000 and over.....												

<sup>1</sup> Less than one-tenth of 1 per cent.

TABLE 89.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS USED IN WIRE MILLS USING PURCHASED RODS: 1919, 1914, AND 1909.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.					
	1919	1914	1909	Amount.			Per cent distribution.		
				1919	1914	1909	1919	1914	1909
Primary power, total.....	2,445	919	443	110,451	83,940	71,959	100.0	100.0	100.0
Owned.....	147	255	315	64,271	67,437	68,923	53.8	80.3	95.7
Steam.....	129	218	268	61,666	63,015	63,516	51.0	75.1	88.1
Engines.....	101			36,021			30.1		
Turbines.....	28	( <sup>2</sup> )	( <sup>2</sup> )	25,645	( <sup>2</sup> )		21.5		
Internal-combustion engines.....	8	22	28	1,966	3,429	3,256	1.7	4.1	4.5
Water wheels, turbines, and motors.....	10	15	19	639	993	2,151	0.5	1.2	3.0
Rented.....	2,298	664	128	55,180	16,503	3,036	46.2	19.7	4.2
Electric.....	2,148	664	128	55,030	16,463	3,031	46.1	19.6	4.2
Other.....	150			150	40	5	0.1	( <sup>3</sup> )	( <sup>3</sup> )
Electric.....	3,329	1,636	1,019	86,646	39,458	18,824	100.0	100.0	100.0
Rented.....	2,148	664	128	55,030	16,463	3,031	63.5	41.7	16.1
Generated by establishments reporting.....	1,181	972	891	31,616	22,995	15,793	36.5	58.3	83.9

<sup>1</sup> Figures for horsepower include for 1909 the amount reported under the head of "Other" owned power.<sup>2</sup> Not reported separately in 1914 and 1909.<sup>3</sup> Less than one-tenth of 1 per cent.

TABLE 90.—FUEL CONSUMED, FOR WIRE MILLS USING PURCHASED RODS: 1919.

STATE.	COAL		Coke (ton, 2,000 pounds).	Fuel oils (barrels).	Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).	STATE.	COAL		Coke (ton, 2,000 pounds).	Fuel oils (barrels).	Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).
	Anthracite <sup>1</sup> (ton, 2,240 pounds).	Bituminous (ton, 2,000 pounds).						Anthracite <sup>1</sup> (ton, 2,240 pounds).	Bituminous (ton, 2,000 pounds).				
United States..1919..	12,573	728,940	18,547	172,093	3,589	419,310	New Jersey.....	2,350	193,189	2,005	33,956	262	2,934
1914..	30,067	523,603	14,329	88,979	( <sup>2</sup> )	415,873	New York.....	229	17,000	270		4	889
Connecticut.....	528	29,943	622	11,125		2,634	Ohio.....		128,065	1,936	2,360		308,444
Illinois.....	1,944	153,384	1,875	4,072	472	4,244	Pennsylvania.....	155	40,282	9,082	15,636	125	92,949
Massachusetts.....	2,420	96,647	174	82,970	2,644	6,089	Wisconsin.....	2,251	2,532	1,398			1,027
							All other States.....	2,687	58,898	1,885	22,574	82	

<sup>1</sup> Includes some semianthracite.<sup>2</sup> Included in figures for fuel oils.

## SPECIAL STATISTICS.

**Materials.**—Table 91 gives statistics for 1919 and 1914 segregated as between the wire mills, so-called, which are the establishments constituting the classified industry, and the wire departments of rolling mills

and other concerns, including the wire-drawing establishments affiliated with wire-rod rolling mills, the general statistics for which are contained in the reports for the rolling-mill establishments.

TABLE 91.—MATERIALS: 1919 AND 1914.

[Ton, 2,000 pounds.]

KIND.	TOTAL.		WIRE MILLS (WIRE RODS PURCHASED).		WIRE DEPARTMENTS OF ROLLING MILLS AND OTHER CONCERNS.		PER CENT OF INCREASE, <sup>1</sup> 1914-1919.		
	1919	1914	1919	1914	1919	1914	Total.	Wire mills.	Wire departments.
Total cost.....			\$102,813,591	\$56,424,494				82.2	.....
Wire rods, cost.....	\$198,580,306	\$104,621,056	\$78,805,136	\$43,374,733	\$119,775,170	\$61,246,293	89.8	81.7	95.0
Steel—									
Tons.....	2,641,684	2,495,201	986,233	847,883	1,655,451	1,647,318	5.9	16.3	0.5
Cost.....	\$122,574,516	\$59,161,732	\$48,052,550	\$21,600,338	\$74,521,960	\$37,552,394	107.0	122.0	98.4
Produced by consumer—									
Tons.....	2,211,400	2,030,735	561,754	395,694	1,649,646	1,635,041	8.9	43.0	0.9
Assigned cost.....	\$99,829,357	\$46,356,401	\$25,678,407	\$9,091,073	\$74,150,950	\$37,264,428	115.0	182.0	99.0
Purchased—									
Tons.....	430,284	464,466	424,479	452,189	5,805	12,277	-7.4	-6.1	-52.7
Cost.....	\$22,745,159	\$12,805,331	\$22,374,143	\$12,517,365	\$371,016	\$287,966	77.6	78.7	28.8
By kinds of steel—									
Bessemer—									
Tons.....	1,142,820	948,552	613,995	539,379	528,834	409,173	20.5	13.8	20.2
Cost.....	\$49,452,733	\$21,046,599	\$27,990,681	\$12,081,408	\$21,462,032	\$8,965,191	135.0	132.0	139.0
Open-hearth—									
Basic—									
Tons.....	1,350,034	1,483,908	305,197	270,260	1,054,837	1,204,708	-8.3	9.3	-12.4
Cost.....	\$92,527,596	\$36,150,876	\$14,349,563	\$8,368,034	\$48,178,033	\$27,782,842	73.0	71.5	73.4
Acid—									
Tons.....	117,172	56,527	45,794	23,535	71,378	33,202	107.0	97.1	114.0
Cost.....	\$8,033,523	\$1,651,223	\$3,211,310	\$860,643	\$4,822,213	\$790,580	386.0	273.0	510.0
Crucible and other—									
Tons.....	21,049	6,154	21,247	6,000	402	145	252.0	254.0	177.0
Cost.....	\$2,560,064	\$313,034	\$2,500,990	\$209,253	\$59,668	\$13,781	718.0	736.0	333.0
Iron—									
Tons.....	1,767	2,579	101	2,579	1,666	.....	-31.5	-96.1	.....
Cost.....	\$174,983	\$121,651	\$18,042	\$121,051	\$156,941	.....	43.8	-85.2	.....
Copper—									
Tons.....	192,274	141,214	82,928	73,545	109,346	67,669	36.2	12.8	61.6
Cost.....	\$62,135,179	\$39,653,902	\$28,451,578	\$20,214,926	\$32,683,603	\$10,438,976	50.7	45.7	68.1
Brass—									
Tons.....	25,751	19,513	1,824	1,050	23,927	17,563	32.0	-6.5	36.2
Cost.....	\$9,200,433	\$4,758,406	\$674,612	\$695,107	\$8,525,821	\$4,063,209	93.4	-2.9	110.0
Zinc—									
Tons.....	1,326	( <sup>2</sup> )	.....	( <sup>2</sup> )	1,326	( <sup>2</sup> )	.....	.....	.....
Cost.....	\$237,299	( <sup>2</sup> )	.....	( <sup>2</sup> )	\$237,299	( <sup>2</sup> )	.....	.....	.....
Other metal, cost <sup>3</sup> .....	\$4,257,896	\$925,365	\$608,356	\$733,741	\$3,649,540	\$191,624	360.0	-17.1	804.0
Wire, plain or coated, not produced in mill reporting:									
Tons.....	76,377	36,889	29,966	9,474	46,411	27,415	107.0	216.3	69.3
Cost.....	\$10,665,029	\$1,904,839	\$3,021,489	\$537,759	\$7,643,560	\$1,457,080	435.0	462.0	426.0
Fuel and rent of power, cost.....			\$4,235,523	\$1,813,172				134.0	.....
All other materials, cost.....			\$16,751,463	\$10,698,800				56.6	.....

<sup>1</sup> A minus sign (—) denotes decrease.<sup>2</sup> Figures not available.<sup>3</sup> Includes bronze, phosphor bronze, monel metal, copper-clad steel, silver and nickel alloys.

**Products.**—The statistics pertaining to products for all classes of establishments are presented in Table 92, segregated as above described for materials. The table carries comparative figures for total wire production, classified as to metal and whether produced

for consumption or for sale. The table also carries percentages of increase for the census period 1914-1919 with respect to total production, and also for the two classes of establishments.

## WIRE.

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TABLE 92.—PRODUCTS: 1919 AND 1914.

[Ton, 2,000 pounds.]

KIND.	TOTAL.		WIRE MILLS (WIRE RODS PURCHASED).		WIRE DEPARTMENTS OF ROLLING MILLS AND OTHER CONCERNS.		PER CENT OF INCREASE, <sup>1</sup> 1914-1919.		
	1919	1914	1919	1914	1919	1914	Total.	Wire mills.	Wire departments.
Wire drawn, total tons.....	2,724,442	2,597,407	1,001,879	898,523	1,722,563	1,698,884	4.9	11.5	1.4
Steel and iron wire:									
Total production.....	2,503,890	2,435,530	920,918	821,509	1,587,972	1,613,961	3.0	12.1	-1.6
For sale (plain or bare).....	592,434	459,909	244,959	206,575	347,475	253,334	28.8	18.6	37.2
For consumption.....	1,916,456	1,975,621	675,959	614,934	1,240,497	1,360,627	-3.0	9.9	-8.8
Copper wire:									
Total production.....	184,569	138,924	78,510	72,401	106,059	66,523	32.9	8.4	59.4
For sale (plain or bare).....	146,991	84,921	60,827	54,210	86,164	30,711	73.1	12.2	180.6
For consumption.....	37,578	54,003	17,683	18,191	19,895	35,812	-30.4	-2.8	-44.4
Brass wire: Total production.....	23,625	19,491	1,704	4,553	21,831	18,400	21.2	-46.2	55.1
Other metal: Total production.....	7,358	3,462	657		6,701		112.5		
PRODUCTS.									
Total value.....	\$392,601,073	\$172,600,546	\$162,151,236	\$81,841,012	\$230,449,837	\$90,759,534	127.4	98.1	153.9
Wire and manufactures of wire.....	\$384,919,118	\$166,999,888	\$167,513,598	\$78,150,487	\$227,405,520	\$38,849,401	130.5	101.6	150.3
Steel and iron—									
Tons.....	2,554,385	2,465,383	943,693	835,928	1,610,692	1,629,455	3.6	12.9	-1.2
Value.....	\$264,777,927	\$116,215,503	\$109,625,257	\$48,809,661	\$168,152,670	\$67,405,842	127.8	118.5	134.0
Plain wire—									
Tons.....	592,434	459,909	244,959	206,575	347,475	253,334	28.8	18.6	37.2
Value.....	\$58,766,450	\$22,316,778	\$28,494,089	\$12,921,557	\$30,262,361	\$9,395,221	163.3	120.5	222.1
Galvanized wire—									
Tons.....	343,005		172,958		170,047				
Value.....	\$32,383,503	\$74,478	\$15,812,146	\$150,016	\$10,571,357	\$218,462	4.9	24.1	-8.7
Other coated wire:									
Tons.....	49,925	\$15,949,531	20,598	\$7,123,026	20,327	\$8,826,505	130.0	160.2	116.5
Value.....	\$5,257,688		\$2,719,707		\$2,537,981				
Wire nails and spikes—									
Kegs (100 pounds).....	12,429,195	12,886,634	3,677,122	3,209,925	8,752,073	9,676,709	-3.5	14.6	-0.6
Value.....	\$40,291,686	\$23,368,633	\$15,002,373	\$6,048,598	\$34,229,313	\$17,320,035	110.9	149.0	97.6
Wire brads and tacks—									
Pounds.....	5,461,597		3,998,138		1,403,450				
Value.....	\$415,521	\$6,670,000	\$248,004	\$18,376,000	\$107,187	\$48,294,000	10.5	9.3	11.0
Wire staples—									
Pounds.....	68,221,338	\$1,324,948	16,084,845	\$386,271	52,136,493	\$938,677	138.6	124.1	144.5
Value.....	\$2,745,070		\$617,027		\$2,128,043				
Barbed wire—									
Tons.....	341,127	343,693	82,050	69,232	259,071	274,401	-0.7	18.5	-5.6
Value.....	\$30,895,619	\$13,764,367	\$7,305,381	\$2,823,668	\$23,590,238	\$10,940,690	124.5	158.7	115.6
Wire rope, cable, and strand—									
Tons.....	103,010	52,735	55,632	43,217	47,378	9,518	95.3	28.7	307.8
Value.....	\$29,825,513	\$7,973,537	\$12,187,216	\$6,881,138	\$17,038,297	\$1,092,399	274.1	77.1	1,514.6
Woven-wire fence and poultry netting—									
Tons.....	312,146	411,400	97,064	128,379	215,082	283,081	-24.1	-24.4	-24.0
Value.....	\$30,526,961	\$10,795,812	\$10,320,876	\$6,763,469	\$20,295,085	\$13,032,343	54.2	52.6	55.0
Other woven-wire products—									
Tons.....	26,614	22,721	13,417	8,614	13,197	14,107	17.1	55.8	-6.5
Value.....	\$4,274,177	\$2,822,689	\$2,184,987	\$915,490	\$2,089,190	\$1,907,199	51.4	138.9	9.5
Cold-rolled flat wire—									
Tons.....	45,908		30,208		15,700				
Value.....	\$9,751,009		\$6,401,009		\$3,350,000				
Washers—									
Tons.....	493	122,720	27	54,211	408	68,509	4.2	16.4	-5.5
Value.....	\$46,152	\$8,899,208	\$7,955	\$4,046,444	\$38,497	\$3,952,794	120.3	130.0	120.9
Other fabricated iron and steel wire products—									
Tons.....	81,482		32,877		48,605				
Value.....	\$10,607,678		\$5,263,527		\$5,344,151				
Copper—									
Bare wire—									
Tons.....	146,991	84,921	60,827	54,210	86,164	30,711	73.1	12.2	186.6
Value.....	\$56,647,607	\$26,206,024	\$26,873,030	\$16,177,678	\$29,774,477	\$10,028,346	116.2	60.1	196.9
Insulated wire and cable <sup>2</sup> —									
Tons.....	72,607	48,366	32,687	32,410	39,920	15,978	50.1	0.9	149.9
Value.....	\$44,465,418	\$15,709,244	\$21,825,439	\$10,855,232	\$22,639,979	\$4,854,012	183.1	101.1	366.4
Woven-wire products—									
Tons.....	206		140		66				
Value.....	\$223,596		\$143,596		\$80,000				
Other fabricated copper-wire products—									
Tons.....	790	2,130		499		1,631	-53.2	-71.9	-47.5
Value.....	\$503,077	\$1,013,282		\$291,380		\$721,902	-19.4	-50.7	-6.8
Brass wire—									
Pounds.....	47,249,835	30,614,500	3,588,721	4,361,148	43,661,114	35,253,352	19.3	-17.7	23.8
Value.....	\$11,542,020	\$6,366,342	\$1,040,427	\$850,017	\$10,501,593	\$5,516,325	81.3	22.4	90.4
Other metals—									
Bronze (including phosphor bronze and monel) wire—									
Pounds.....	1,342,706		163,242		1,179,464				
Value.....	\$624,520		\$93,820		\$530,700				
Nickel, nickel silver, etc., wire—									
Pounds.....	1,752,952		649,000		1,103,952				
Value.....	\$1,457,588		\$714,163		\$745,425				
Other (includes copper-clad steel) wire—									
Pounds.....	10,671,138	6,929,398	501,938	5,344,730	10,169,200	1,584,608	112.4	-75.4	745.7
Value.....	\$3,876,060	\$1,489,493	\$197,866	\$1,166,519	\$3,078,194	\$322,974	347.8	-13.8	1,653.6
Fabricated wire products—									
Pounds.....	948,858				948,858				
Value.....	\$711,405				\$711,405				
Finished products, other than wire... value..	\$3,058,042	\$2,581,000	\$2,171,718	\$2,088,590	\$886,324	\$492,410	18.5	4.0	80.0
Sulphate of iron:									
Tons.....	36,747		23,506		13,241				
Value.....	\$669,871	\$2,692,302	\$416,342	\$1,439,455	\$253,529	\$1,252,837	63.0	54.9	72.2
All other products, value.....	\$3,717,944		\$1,813,480		\$1,904,464				
Amount received for custom work and repairing, value.....	\$236,098	\$327,356	\$236,098	\$162,470		\$164,886	-27.9	45.3	-100.0

<sup>1</sup> A minus sign (-) denotes decrease.<sup>2</sup> Insulated wire and cable made by all establishments, including the electrical machinery, apparatus, and supplies industry in 1919, 224,000 net tons, value \$128,682,339; 1914, value \$89,605,513; 1909, \$51,624,737.



## MANUFACTURES.

Number of establishments.—Table 93 shows the number of establishments reporting the various specified products, distributed by states, for 1919 and 1914.

Equipment.—Statistics of equipment installed in the wire-drawing plants, 1919 and 1914, are presented in Table 94.

TABLE 93.—NUMBER OF ESTABLISHMENTS REPORTING SPECIFIED PRODUCTS, BY STATES: 1919 AND 1914.

STATE.	Total number of establishments.		Wire mills.		Departments of rolling mills and other concerns.		STEEL AND IRON.																COPPER.								OTHER METALS AND ALLOYS.			
							Wiro.		Coated wire.		Wire nails and spikes.		Wire brads, tacks, and staples.		Barbed wire.		Wire rope and strand.		Woven wire fence and poultry netting.		Other woven and fabricated wire products.		Wiro.		Insulated wire.		Woven wire products.		Other fabricated wire products.		Brass.		Other metal.	
	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914		
United States.....	108	99	66	54	42	45	74	69	43	40	35	37	24	24	27	27	16	12	27	26	33	41	30	28	14	9	3	3	1	4	22	28	24	13
Wire mills.....	66	54	66	54	.....	.....	40	45	24	22	17	18	8	8	11	10	9	8	12	11	18	23	16	17	7	6	2	3	.....	2	8	10	9	5
Wire departments of rolling mills and other concerns.	42	45	.....	.....	42	45	25	24	19	18	18	19	16	16	16	17	7	4	15	15	15	18	15	11	7	3	1	...	1	2	14	18	15	8
Alabama.....	2	2	.....	.....	2	2	2	2	2	2	2	2	2	2	2	2	.....	.....	2	2	1	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Colorado.....	1	1	.....	.....	1	1	1	1	1	1	1	1	1	1	1	1	.....	.....	1	1	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Connecticut.....	10	15	7	6	9	9	6	5	3	3	.....	.....	.....	.....	.....	.....	.....	.....	1	1	1	1	8	6	4	2	1	2	.....	.....	10	10	12	6
Georgia.....	1	1	.....	.....	1	1	1	1	1	1	.....	.....	.....	.....	.....	.....	.....	.....	1	1	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Illinois.....	12	11	10	9	2	2	11	9	8	7	7	8	6	6	7	7	2	1	8	8	7	7	2	2	1	1	.....	.....	1	.....	1	.....	.....	
Indiana.....	4	4	2	2	2	2	4	4	4	3	4	4	2	2	4	3	1	.....	4	3	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Kentucky.....	.....	1	.....	.....	1	1	.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Massachusetts.....	11	9	9	8	2	1	0	9	6	4	1	2	.....	2	.....	.....	3	4	.....	.....	4	7	3	3	1	1	.....	1	2	2	2	1	1	
Michigan.....	2	2	1	.....	1	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....	.....	2	2	1	1
Missouri.....	1	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Montana.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
New Jersey.....	11	10	7	9	4	1	7	6	1	3	2	1	1	1	.....	.....	2	2	.....	.....	4	5	1	5	2	2	.....	.....	1	4	5	4	3	
New York.....	12	11	8	6	4	5	4	4	1	.....	.....	.....	.....	.....	.....	.....	1	1	1	1	1	2	8	7	3	1	2	1	.....	4	5	4	2	
Ohio.....	9	10	5	5	4	5	9	10	7	6	5	6	3	3	7	4	2	1	2	7	5	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Pennsylvania.....	18	17	11	7	7	10	16	15	9	10	8	7	8	7	8	2	2	2	7	7	7	8	1	1	.....	.....	.....	.....	.....	.....	2	2	.....	.....
Rhode Island.....	4	3	2	1	2	2	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Wisconsin.....	3	2	3	1	.....	1	3	1	.....	.....	2	1	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	

TABLE 94.—EQUIPMENT: 1919 AND 1914.

[Ton, 2,000 pounds.]

KIND.	TOTAL.			WIRE MILLS.		WIRE DEPARTMENTS OF ROLLING MILLS AND OTHER CONCERNS.	
	1919	1914	Per cent of increase. <sup>1</sup>	1919	1914	1919	1914
Wire-drawing blocks:							
Number.....	62,689	51,181	22.5	26,920	33,242	35,769	17,939
Rod.....	10,530	7,503	40.3	3,165	3,005	7,365	4,498
Redrawing.....	10,202	9,067	12.5	6,651	6,565	3,551	2,502
Fine wire.....	41,057	34,611	21.2	17,104	23,672	24,853	10,939
Annual capacity, tons.....	4,169,467	3,852,000	8.2	1,508,043	1,240,000	2,661,424	2,603,000
Wire-nail machines:							
Number.....	5,383	5,212	3.3	1,652	1,313	3,731	3,894
Annual capacity, kegs (100 pounds).....	22,049,170	23,904,000	-7.8	7,451,450	5,965,000	14,507,720	17,039,000
Barbed-wire machines:							
Number.....	1,569	( <sup>2</sup> )	.....	478	( <sup>2</sup> )	1,091	( <sup>2</sup> )
Annual capacity, tons.....	855,997	( <sup>2</sup> )	.....	252,448	( <sup>2</sup> )	603,549	( <sup>2</sup> )
Woven-wire fence machines:							
Number.....	457	583	-21.6	100	161	357	422
Annual capacity, tons.....	677,195	732,000	-7.5	154,552	190,000	522,643	542,000
Poultry-netting machines:							
Number.....	164	( <sup>2</sup> )	.....	84	( <sup>2</sup> )	80	( <sup>2</sup> )
Annual capacity, tons.....	41,893	( <sup>2</sup> )	.....	28,847	( <sup>2</sup> )	13,046	( <sup>2</sup> )
Stands cold-rolling machines:							
Number.....	687	( <sup>2</sup> )	.....	380	( <sup>2</sup> )	307	( <sup>2</sup> )
Annual capacity, tons.....	184,215	( <sup>2</sup> )	.....	59,915	( <sup>2</sup> )	124,300	( <sup>2</sup> )

<sup>1</sup> A minus sign (-) denotes decrease.<sup>2</sup> Figures not available.

Equipment, by states.—Table 95 presents statistics for equipment, according to character of the machines.

TABLE 95.—EQUIPMENT, BY STATES: 1919.

STATE.	Wire-drawing blocks—annual capacity, tons.	WIRE-NAIL MACHINES.		BARBED-WIRE MACHINES.		WOVEN-WIRE FENCE MACHINES.		POULTRY-NETTING MACHINES.		STANDS COLD-ROLLING MACHINES.	
		Number.	Annual capacity, kegs (100 pounds).	Number.	Annual capacity, tons.	Number.	Annual capacity, tons.	Number.	Annual capacity, tons.	Number.	Annual capacity, tons.
United States.....	4,100,467	5,883	22,049,170	1,569	855,997	457	677,195	104	41,893	687	184,215
Pennsylvania.....	1,443,529	1,759	9,205,846	740	380,268	222	267,449	8	1,500	15	12,150
Illinois.....	715,733	615	3,115,824	313	157,429	95	191,677	67	27,049	8	900
Ohio.....	624,600	1,618	4,450,000	152	98,800	28	53,000	.....	.....	169	120,300
New Jersey.....	257,413	31	30,000	.....	.....	.....	.....	.....	.....	216	21,315
Massachusetts.....	253,830	68	140,000	.....	.....	.....	.....	.....	.....	275	29,550
Alabama.....	215,000	316	1,840,000	129	68,000	55	98,000	.....	.....	.....	.....
Indiana.....	184,000	333	1,500,000	122	49,500	35	40,700	9	3,000	.....	.....
Colorado.....	180,000	250	1,200,000	69	75,000	16	25,000	5	3,000	.....	.....
New York.....	137,880	267	450,000	24	16,000	.....	.....	53	2,500	4	200
All other states.....	157,582	126	117,500	20	3,000	7	1,369	22	4,844	.....	.....

## GENERAL TABLES.

Comparative summary, by states.—Table 96 shows the comparative statistics for the number of establishments, average number of wage earners, primary horsepower, wages, cost of materials, and

value of products for the census years 1919, 1914, and 1909.

Detailed statement, by states.—Table 97 is a detailed statement, by states, for the census of 1919.

TABLE 96.—COMPARATIVE SUMMARY FOR WIRE MILLS USING PURCHASED RODS: 1919, 1914, AND 1909.

STATE.	Cen-sus year.	Num-ber of estab-lish-ments.	Wage earners (aver-age num-ber).	Pri-mary horse-power.	Wages.	Cost of mate-rials.	Value of prod-ucts.	STATE.	Cen-sus year.	Num-ber of estab-lish-ments.	Wage earners (aver-age num-ber).	Pri-mary horse-power.	Wages.	Cost of mate-rials.	Value of prod-ucts.
					Expressed in thousands.								Expressed in thousands.		
United States.....	1919	66	19,741	119,451	\$29,290	\$102,814	\$162,151	Massachusetts.....	1919	9	5,203	24,799	\$7,353	\$11,874	\$24,552
	1914	54	17,600	83,940	11,021	56,424	81,841		1914	8	2,809	15,142	2,005	4,656	8,389
	1909	56	18,084	71,959	10,316	60,543	84,487		1909	10	3,718	10,498	2,218	5,538	9,580

## MANUFACTURES.

TABLE 97.—DETAILED STATEMENT OF WIRE MILLS USING PURCHASED RODS: 1919.

STATE.	Number of establishments.	PERSONS ENGAGED IN THE INDUSTRY.								WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.						EXPENSES.		
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks, etc.		Wage earners.			Total.	16 and over.		Under 16.		Capital.	Salaries and wages.		
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.	Female.		Officials.	Clerks, etc.	
								Maximum month.	Minimum month.									
United States.	66	22,236	13	509	1,295	588	19,741	Se 21,282	Oc 17,335	21,600	20,486	1,037	54	23	\$102,016,777	\$2,464,056	\$2,990,350	
Connecticut.....	7	1,555	3	47	93	34	1,378	Fe 1,593	Ap 1,056	1,397	1,245	147	4	.....	8,136,575	227,997	202,785	
Illinois.....	10	3,282	.....	133	275	99	2,776	An 3,309	Oc 1,488	3,109	3,005	104	.....	.....	15,477,020	505,313	631,450	
Massachusetts.....	9	5,715	4	89	239	180	5,203	De 5,905	Je 4,910	5,905	5,525	325	37	18	22,027,351	409,217	737,190	
New Jersey.....	7	2,180	.....	89	167	51	1,923	Oc 2,086	My 1,717	2,057	1,959	65	3	.....	7,972,875	247,105	299,555	
Pennsylvania.....	11	2,471	1	76	139	55	2,203	An 2,469	Oc 2,005	2,302	2,283	15	4	.....	15,376,302	282,044	287,441	
All other states <sup>1</sup> .....	22	7,093	5	215	385	109	6,259	.....	.....	6,830	6,438	381	6	5	33,026,654	792,380	831,929	

STATE.	EXPENSES—continued.						Value of products.	Value added by manufacture.	POWER.						
	Salaries and wages—Con.	For contract work.	Rent and taxes.		For materials.				Primary horsepower.						Electric horsepower generated in establishments reporting.
			Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.			Total.	Owned.				Rented. <sup>2</sup>	
										Steam engines (not turbines).	Steam turbines.	Internal-combustion engines.	Water power. <sup>2</sup>		
United States.	\$20,289,667	\$774,423	\$94,543	\$3,531,938	\$98,578,098	\$4,235,523	\$162,151,236	\$59,337,645	119,451	36,021	25,645	1,966	639	55,180	31,616
Connecticut.....	2,083,474	3,129	3,243	209,518	4,346,532	258,141	9,083,050	4,480,377	6,354	2,876	1,675	50	150	1,603	4,944
Illinois.....	4,605,270	.....	3,800	853,442	17,703,910	682,995	29,855,393	11,408,488	19,554	13,060	1,920	.....	100	4,474	4,484
Massachusetts.....	7,353,067	4,386	46,222	469,923	10,774,689	1,098,930	24,552,410	12,678,791	24,799	7,577	2,210	.....	200	14,812	6,327
New Jersey.....	2,851,843	.....	1,073	311,948	14,149,600	549,674	19,878,316	5,179,142	13,332	1,955	2,300	1,786	.....	7,291	2,735
Pennsylvania.....	3,850,399	.....	.....	573,862	13,805,972	350,433	19,595,888	5,379,483	25,761	2,873	13,877	130	.....	8,881	9,176
All other states <sup>1</sup> .....	8,565,614	766,908	10,405	1,116,295	37,677,865	1,297,450	59,186,179	20,211,364	29,661	7,680	3,663	.....	189	18,119	3,950

<sup>1</sup> All other states embrace: Indiana, 2 establishments; Michigan, 1; Missouri, 1; New York, 8; Ohio, 5; Rhode Island, 2; and Wisconsin, 3.<sup>2</sup> Includes water wheels and turbines (irrespective of ownership of water supply).<sup>3</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants).

# CAST-IRON PIPE.

## GENERAL STATISTICS.

**General character of the industry.**—Establishments primarily engaged in the manufacture of cast-iron pipe were first segregated as an industry at the census of 1909. Prior thereto they were included with those for foundry and machine-shop products, which included iron foundries not specially provided for.

**Comparative summary.**—Table 1 presents the general statistics for 1919, 1914, and 1909.

**Principal states, ranked by value of products.**—Statistics are presented in Table 2 for the chief factors: Number of establishments; number of wage earners; value of products; and value added by manufacture, for all states for which the statistics can be reported.

**Persons engaged in the industry.**—The age classification of the average number of wage earners in Table 3 is an estimate obtained by the method described in the "Explanation of terms." Figures for states will be found in Table 12.

**Wage earners, by months.**—The statistics for wage earners in Table 4 show the labor movement in accordance with the industrial conditions existing throughout the year.

**Prevailing hours of labor.**—Table 5 shows that of the total number of wage earners employed only 3.1 per cent were in establishments where the prevailing hours per week were 48 or fewer in 1909, and 1.4 per cent in 1914. In 1919 this ratio was 12.4 per cent. On the other hand, in 1909, 76 per cent were in the "60 hours

per week" group, and in 1914, 64 per cent, whereas in 1919 this group represented but 21.4 per cent.

**Size of establishments, by average number of wage earners.**—Table 6 shows the industry to be one of relatively large units. Only six establishments with 180 wage earners are found in the groups employing 50 wage earners or less in 1919 and nine establishments with 179 wage earners in 1914.

**Size of establishments, by value of products.**—The average value of products per establishment for all classes in 1919 was approximately \$850,000, as compared with \$450,000 in 1914 and \$700,000 in 1909. The increase from 1914 to 1919 was due primarily to enhanced values, and as a result, Table 7, being based upon value of products, shows heavy gains in the higher groups.

**Character of ownership.**—The industry is almost entirely under corporate ownership. Of the 59 establishments, 56 are owned by corporations, and they reported 98.4 per cent of the value of all products.

**Number and horsepower of types of prime movers.**—Table 8 gives the total horsepower reported for the industry. Of the total primary power, 60 per cent was purchased electric power in 1919, as compared with 31.7 per cent in 1914 and 14.9 in 1909.

**Fuel consumed.**—Table 9 shows the consumption of fuel, by kinds and by states. The figures for gas include both manufactured and natural gas.

TABLE 1.—COMPARATIVE SUMMARY: 1919, 1914, AND 1909.

	1919	1914	1909	PER CENT OF INCREASE. <sup>1</sup>			1919	1914	1909	PER CENT OF INCREASE. <sup>1</sup>	
				1914-1919	1909-1914					1914-1919	1909-1914
Number of establishments...	50	50	52			Salaries and wages.....	\$17,136,610	\$8,112,385	\$7,427,175	111.2	9.2
Persons engaged.....	13,777	13,290	12,884	3.7	3.2	Salaries.....	2,431,212	1,030,409	924,837	134.6	12.1
Proprietors and firm members.....	4	8	7			Wages.....	14,705,398	7,075,970	6,502,338	107.8	8.8
Salaried employees.....	1,148	725	649	58.3	11.7	Paid for contract work.....	37,795	2,672	8,210	1314.5	-67.5
Wage earners (average number).....	12,625	12,557	12,228	0.5	2.7	Rent and taxes.....	1,267,255	167,226	120,900	657.8	38.3
Primary horsepower.....	28,741	25,864	18,737	11.1	35.0	Cost of materials.....	25,386,552	10,930,141	18,884,842	49.9	-10.3
Capital.....	\$42,863,026	\$26,981,070	\$23,110,318	58.9	16.7	Value of products.....	50,235,101	26,659,365	20,153,723	88.4	-8.6
						Value added by manufacture <sup>2</sup> .....	24,848,549	9,720,224	10,209,381	155.4	-5.3

<sup>1</sup> A minus sign (—) denotes decrease; percentages are omitted where base is less than 100.

<sup>2</sup> Value of products less cost of materials.

## MANUFACTURES.

TABLE 2.—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
		Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.
United States.....	59	12,625	100.0	.....	\$50,235	100.0	.....	\$24,840	100.0	.....
Alabama.....	21	5,285	41.9	1	18,784	37.4	1	9,323	37.5	1
New Jersey.....	8	2,035	16.1	2	9,030	18.0	2	4,203	17.3	3
Pennsylvania.....	7	1,707	13.5	3	8,710	17.3	3	4,556	18.4	2
New York.....	6	312	2.5	7	1,842	2.7	7	758	3.0	7
All other states.....	18	3,280	26.0	.....	12,869	24.6	.....	5,019	23.8	.....

TABLE 3.—PERSONS ENGAGED IN THE INDUSTRY: 1919, 1914, AND 1909.

CLASS.	Census year.	Total.	Male.	Female.	PER CENT OF TOTAL.		CLASS.	Census year.	Total.	Male.	Female.	PER CENT OF TOTAL.	
					Male.	Female.						Male.	Female.
All classes.....	1919	13,777	13,545	232	98.3	1.7	Clerks and other subordinate salaried employees.	1919	725	549	176	75.7	24.3
	1914	13,290	13,190	100	99.2	0.8		1914	545	459	86	84.2	15.8
	1909	12,884	12,832	52	99.6	0.4		1909	464	424	40	91.4	8.6
Proprietors and officials.....	1919	427	423	4	99.1	0.9	Wage earners (average number).....	1919	12,625	12,573	52	99.6	0.4
	1914	188	187	1	99.5	0.5		1914	12,557	12,544	13	99.9	0.1
	1909	192	192	.....	.....	.....		1909	12,228	12,216	12	99.9	0.1
Proprietors and firm members.....	1919	4	4	.....	100.0	.....	16 years of age and over.....	1919	12,588	12,536	52	99.6	0.4
	1914	8	8	.....	100.0	.....		1914	12,507	12,494	13	99.9	0.1
	1909	7	7	.....	100.0	.....		1909	12,155	12,143	12	99.9	0.1
Salaried officers of corporations....	1919	108	105	3	97.2	2.8	Under 16 years of age.....	1919	37	37	.....	100.0	.....
	1914	78	78	.....	100.0	.....		1914	50	50	.....	100.0	.....
	1909	61	61	.....	100.0	.....		1909	73	73	.....	100.0	.....
Superintendents and managers....	1919	315	314	1	99.7	0.3							
	1914	102	101	1	99.0	1.0							
	1909	124	124	.....	100.0	.....							

TABLE 4.—WAGE EARNERS, BY MONTHS, FOR STATES: 1919.

[The month of maximum employment is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
United States:														
1919.....	12,625	10,615	9,924	<i>9,758</i>	10,529	11,268	11,482	13,008	13,781	14,625	15,478	15,454	<b>15,585</b>	62.6
Males.....	12,573	10,569	9,883	<i>9,713</i>	10,494	11,227	11,434	12,960	13,723	14,570	15,407	15,385	<b>15,508</b>	62.7
Females.....	52	46	41	<i>45</i>	35	41	48	58	58	55	71	69	<b>79</b>	44.3
1914.....	12,557	11,816	12,572	13,193	12,701	12,613	12,849	13,221	<b>13,427</b>	13,211	12,555	11,330	<i>11,190</i>	83.3
Alabama.....	5,285	3,830	<i>3,551</i>	3,719	4,189	4,539	4,598	5,777	6,010	6,496	6,000	6,863	<b>6,948</b>	51.1
New Jersey.....	2,035	1,908	1,657	<i>1,602</i>	1,842	1,914	2,030	2,059	2,221	2,197	2,330	2,278	<b>2,372</b>	67.5
New York.....	312	300	326	317	303	316	291	277	309	314	312	356	<b>353</b>	73.3
Pennsylvania.....	1,707	1,620	<i>1,429</i>	1,454	1,492	1,705	1,692	1,720	1,769	1,861	1,950	1,923	<b>1,869</b>	73.3
All other states.....	3,286	2,957	2,661	<i>2,661</i>	2,703	2,794	2,901	3,163	3,472	3,757	3,986	4,034	<b>4,043</b>	65.8

# CAST-IRON PIPE.

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TABLE 5.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR STATES: 1919 AND 1914.

STATE.	Cen- sus year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—					STATE.	Cen- sus year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—				
			48 and under.	Be- tween 48 and 54.	54.	Be- tween 54 and 60.	60.				48 and under.	Be- tween 48 and 54.	54.	Be- tween 54 and 60.	60.
United States.....	1919	12,625	1,504	440	4,709	3,208	2,704	New York <sup>2</sup> .....	1919	812	63	68	138	43	.....
	1914	12,557	171	.....	1,303	3,026	8,057								
	1909	12,228	378	.....	1,425	1,131	9,294	Pennsylvania.....	1919	1,707	.....	130	673	546	358
Alabama.....	1919	5,235	1,032	.....	1,580	1,456	1,217		1914	1,835	.....	.....	101	194	1,540
	1914	3,696	113	.....	795	802	1,986								
New Jersey.....	1919	2,035	.....	242	548	741	504								
	1914	3,421	.....	.....	100	1,875	1,446								

<sup>1</sup> Includes 293 of group "44 and under."

<sup>2</sup> Figures for 1914 not available.

TABLE 6.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR STATES:- 1919 AND 1914.

STATE.	Cen- sus year.	TOTAL.		ESTABLISHMENTS EMPLOYING—											
		Establish- ments.	Wage earners (average number).	1 to 5 wage earners, inclusive.		6 to 20 wage earners, inclusive.		21 to 50 wage earners, inclusive.		51 to 100 wage earners, inclusive.		101 to 250 wage earners, inclusive.		251 to 500 wage earners, inclusive.	
				Establish- ments.	Wage earners.	Establish- ments.	Wage earners.	Establish- ments.	Wage earners.	Establish- ments.	Wage earners.	Establish- ments.	Wage earners.	Establish- ments.	Wage earners.
United States.....	1919	59	12,625	.....	.....	2	15	4	105	14	961	20	3,310	14	4,772
	1914	59	12,557	2	8	3	30	4	132	12	984	18	2,580	14	4,825
Alabama.....	1919	21	5,285	.....	.....	.....	.....	.....	.....	5	341	8	1,291	6	1,690
	1914	20	3,696	1	4	2	31	1	35	3	237	8	1,149	3	988
New Jersey.....	1919	8	2,035	.....	.....	.....	.....	.....	.....	2	145	3	559	2	770
	1914	9	3,421	.....	.....	.....	.....	.....	.....	1	100	3	516	3	1,206
New York.....	1919	5	312	.....	.....	.....	.....	2	86	3	226	.....	.....	.....	.....
Pennsylvania.....	1919	7	1,707	.....	.....	.....	.....	.....	.....	2	123	2	244	2	667
	1914	7	1,835	.....	.....	.....	.....	.....	.....	2	193	2	231	2	802

<sup>1</sup> Figures for 1914 not available.

TABLE 7.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919, 1914, AND 1909.

VALUE OF PRODUCT.	NUMBER OF ESTABLISHMENTS.			AVERAGE NUMBER OF WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
	1919	1914	1909	1919	1914	1909	1919	1914	1909	1919	1914	1909
All classes.....	59	59	52	12,625	12,557	12,228	\$50,235,101	\$26,650,305	\$29,153,723	\$24,848,549	\$9,720,224	\$10,269,381
Less than \$100,000.....	3	14	11	60	1590	1304	180,264	1829,449	1540,922	91,401	1398,050	1246,709
\$100,000 to \$500,000.....	23	27	28	1,975	7,190	4,815	6,927,931	6,351,931	10,041,104	3,825,542	5,634,793	3,920,505
\$500,000 to \$1,000,000.....	15	10	13	2,813	4,817	7,109	10,308,067	7,675,640	17,971,697	5,430,965	3,645,775	6,102,047
\$1,000,000 and over.....	18	8	13	7,771	.....	.....	32,758,839	11,802,845	.....	16,447,641	.....	.....
PER CENT DISTRIBUTION.												
All classes.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than \$100,000.....	5.1	23.7	21.2	0.5	4.4	2.5	0.4	3.1	1.9	0.4	4.1	2.4
\$100,000 to \$500,000.....	39.0	45.7	53.8	15.6	57.2	39.4	13.8	23.8	36.5	15.4	58.4	38.2
\$500,000 to \$1,000,000.....	25.4	17.0	25.0	22.3	.....	.....	20.0	28.8	61.6	22.1	.....	.....
\$1,000,000 and over.....	30.5	13.6	.....	61.5	38.4	58.1	65.2	44.3	.....	62.1	37.5	59.4

<sup>1</sup> Includes the groups "Less than \$5,000" and "\$5,000 to \$20,000."

## MANUFACTURES.

TABLE 8.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919, 1914, AND 1909.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.					
	1919	1914	1909	Amount.			Per cent distribution.		
				1919	1914	1909	1919	1914	1909
Primary power, total.....	1,040	589	354	28,741	25,864	18,737	100.0	100.0	100.0
Owned.....	92	145	102	11,601	17,606	15,950	40.0	68.3	85.1
Steam.....	90	135	150	11,297	15,956	14,385	39.3	61.7	76.8
Engines.....	88	( <sup>1</sup> )	( <sup>1</sup> )	10,547	( <sup>1</sup> )	( <sup>1</sup> )	36.7	.....	.....
Turbines.....	4	( <sup>1</sup> )	( <sup>1</sup> )	750	( <sup>1</sup> )	( <sup>1</sup> )	2.6	.....	.....
Internal-combustion engines.....	1	8	11	4	1,500	1,505	( <sup>2</sup> )	5.8	8.0
Water wheels and turbines.....	1	2	1	200	200	60	0.7	0.8	0.3
Rented—Electric.....	948	444	192	17,240	8,198	2,787	60.0	31.7	14.9
Electric.....	2,106	1,616	1,189	35,493	28,618	19,333	100.0	100.0	100.0
Rented.....	948	444	192	17,240	8,198	2,787	48.6	28.7	14.4
Generated by establishments reporting.....	1,158	1,172	997	18,253	20,320	16,546	51.4	71.3	85.6

<sup>1</sup> Not reported separately.<sup>2</sup> Less than one-tenth of 1 per cent.

TABLE 9.—FUEL CONSUMED, BY STATES: 1919 AND 1914.

STATE.	Cen- sus year.	COAL.		Coke (tons, 2,000 pounds).	Fuel oils (barrels).	Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).
		Anthracite (tons, 2,240 pounds).	Bituminous (tons, 2,000 pounds).				
United States.....	1919	27,374	96,387	256,781	419	658	5,386
	1914	45,663	99,991	248,305	2,036	( <sup>1</sup> )	163,833
Alabama.....	1919	.....	28,520	132,314	.....	.....	175
	1914	.....	25,382	88,684	1,067	( <sup>1</sup> )	.....
New Jersey.....	1919	16,751	21,067	32,255	10	50	.....
	1914	30,094	17,539	46,146	692	.....	151,013
New York.....	1919	106	1,096	3,601	8	70	.....
Pennsylvania.....	1919	9,799	15,618	31,709	51	126	1,335
	1914	15,416	10,424	38,294	270	( <sup>1</sup> )	908
All other states.....	1919	718	30,086	56,842	350	412	3,876
	1914	153	40,646	75,181	7	( <sup>1</sup> )	11,912

<sup>1</sup> Included in figures for fuel oils.

## SPECIAL STATISTICS.

Certain additional information concerning the quantity and value of products for the industry is collected by means of supplemental schedules, data for which are presented in Table 10.

**Products—comparative statistics, by states.**—Table 10 presents detailed statistics of products for 1919 and 1914. The table shows distribution by states so far as the figures can be shown without disclosing individual operations. There is a considerable production of cast-iron pipe by establishments falling under other industry classifications, which has been included. With respect to 1914, this subsidiary production is included in the totals, but figures are not available to permit a distribution by states.

In 1919 there were 59 establishments in the classified industry, and 7 establishments in other industries reporting cast-iron pipe products. Of these, 18 establishments manufactured bell-and-spigot pipe, 15 flanged pipe, 3 culvert pipe, 22 gas and water pipe fittings, and 40 reported the manufacture of soil and plumbers' pipe and fittings.

The tonnage production of cast-iron pipe and fittings was 702,554 tons in 1919 as compared with 1,120,721 tons in 1914, a decrease of 37.3 per cent; but in value these products increased from \$25,979,192 in 1914 to \$48,514,581 in 1919, an increase of 86.7 per cent. The figures show an average ton value of \$69 for 1919 as compared with \$23.20 for 1914. Considering the different kinds of pipe products, there was a decrease of 54.7 per cent for the period 1914-1919 in tonnage of bell-and-spigot pipe, with an increase of 15.5 per cent in value; a decrease of 9.9 per cent in the tonnage of flanged pipe, with an increase of 143 per cent in value; a decrease of 48.5 per cent in culvert pipe, with an increase of 39.6 per cent in value; and a slight increase in tonnage of pipe fittings, namely, 1.8 per cent, with an increase of 212 per cent in value. Soil and plumbers' pipe and fittings increased 20.3 per cent in tonnage and 230 per cent in value. The figures show fairly uniform increases in unit values for the various classes, namely, bell-and-spigot pipe \$20 per

ton in 1914, to \$51 in 1919; flanged pipe, \$27 in 1914, \$72 in 1919; soil and plumbers' pipe and fittings, \$29 in 1914, and \$80 in 1919.

TABLE 10.—PRODUCTS—COMPARATIVE STATISTICS, BY STATES: 1919 AND 1914.

	1919		1914	
	Quantity (tons, 2,000 pounds).	Value.	Quantity (tons, 2,000 pounds).	Value.
Total.....	702,554	\$51,902,763	1,120,721	\$28,102,607
Cast-iron pipe industry.....		50,235,101		26,650,365
Subsidiary cast-iron pipe products, other industries.....		1,667,662		1,443,242
Cast-iron pipe and fittings.....	702,554	48,514,581	1,120,721	25,979,192
Gas and water pipe and fittings.....	447,881	28,124,128	1,009,069	19,805,484
Alabama.....	149,761	8,895,383	186,415	4,469,284
New Jersey.....	80,694	4,019,620	215,481	4,689,296
New York.....	2,069	254,352	876	48,835
Pennsylvania.....	69,834	5,102,831	191,179	3,977,619
Other states.....	145,523	8,951,942	286,487	5,855,720
Bell-and-spigot pipe.....	375,203	19,257,663	1,828,905	16,669,533
Alabama.....	123,433	6,124,643	170,515	3,945,013
New Jersey.....	68,652	3,464,419	193,454	3,828,131
Pennsylvania.....	67,236	3,519,357	180,994	3,521,563
Other states.....	115,882	6,149,244	262,343	4,331,983
Flanged pipe.....	23,791	1,714,250	127,289	1,706,531
Alabama.....	7,916	545,394	8,051	176,685
New Jersey.....	4,855	370,028	8,918	238,590
Other states.....	11,020	798,828	5,011	140,596
Culvert pipe.....	5,657	344,062	11,011	124,527
Pipe fittings.....	243,280	6,808,153	41,854	12,182,893
Alabama.....	17,944	2,189,297	4,860	263,935
New Jersey.....	6,993	1,070,849	10,970	583,076
New York.....	2,069	254,352	876	48,835
Pennsylvania.....	2,465	1,568,908	8,614	420,967
Other states.....	13,769	1,718,747	14,871	797,928
Soil and plumbers' pipe and fittings.....	254,673	20,390,453	121,652	16,173,708
Alabama.....	122,827	9,336,677	77,996	2,161,644
New Jersey.....	34,543	3,420,445	48,434	1,649,271
New York.....	18,088	1,518,978	10,896	321,525
Pennsylvania.....	40,062	3,080,711	17,425	501,823
Other states.....	33,153	2,433,642	30,814	866,933
All other castings.....	10,401	1,614,465	13,581	681,737
Other products.....		1,773,717		1,441,673

<sup>1</sup> Includes production not distributed by states, 1914:

Gas and water pipe and fittings.....	28,631 tons, \$769,730
Bell-and-spigot pipe.....	21,599 tons, 542,843
Flanged pipe.....	5,309 tons, 152,660
Culvert pipe and fittings.....	1,723 tons, 74,227
Soil and plumbers' pipe and fittings.....	26,087 tons, 673,512

<sup>2</sup> Number of establishments, 1919:

Bell-and-spigot pipe.....	18
Flanged pipe.....	15
Culvert pipe.....	3
Pipe fittings.....	22
Soil and plumbers' pipe and fittings.....	40



## MANUFACTURES.

## GENERAL TABLES.

Table 11 gives, for 1919, 1914, and 1909, a comparative summary, by states, for number of establishments, average number of wage earners, primary horsepower, wages, cost of materials, and value of

products. Table 12 presents, for 1919, the detailed statistics for the industry for such states as can be shown without disclosing the operations of individual establishments.

TABLE 11.—COMPARATIVE SUMMARY, BY STATES: 1919, 1914, AND 1909.

STATE.	Cen- sus year.	Num- ber of estab- lish- ments	Wage earners (aver- age num- ber).	Pri- mary horse- power.	Expressed in thousands.			STATE.	Cen- sus year.	Num- ber of estab- lish- ments	Wage earners (aver- age num- ber).	Pri- mary horse- power.	Expressed in thousands.		
					Wages.	Cost of mate- rials.	Value of prod- ucts.						Wages.	Cost of mate- rials.	Value of prod- ucts.
United States.....	1919	59	12,625	28,741	\$14,705	\$25,387	\$50,235	New York.....	1919	5	312	787	\$373	\$585	\$1,342
	1914	59	12,567	25,864	7,076	16,930	26,659		1914	3	213	293	124	186	370
	1909	52	12,228	18,737	6,502	18,884	20,154		1909	4	464	1,052	268	687	990
Alabama.....	1919	21	5,285	10,754	5,776	9,461	18,784	Pennsylvania.....	1919	7	1,707	3,892	2,148	4,154	8,710
	1914	20	3,696	6,130	2,054	3,907	6,754		1914	7	1,835	4,062	1,029	3,295	4,551
	1909	14	2,878	4,632	1,393	3,706	6,097		1909	5	1,435	2,531	711	2,423	3,534
New Jersey.....	1919	8	2,035	3,714	2,655	4,737	9,030	All other states.....	1919	18	3,286	9,614	3,753	6,450	12,309
	1914	9	3,421	4,785	1,991	4,784	7,353		1914	20	3,592	10,594	1,878	4,758	7,631
	1909	8	3,275	4,035	1,951	5,355	8,003		1909	21	4,176	6,487	2,170	6,713	10,580

TABLE 12.—DETAILED STATEMENT BY STATES: 1919.

STATE.	Num-ber of estab-lish-ments	PERSONS ENGAGED IN THE INDUSTRY.								WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.				EXPENSES.		
		Total.	Pro-pri-ators and firm mem-bers.	Sala-ried offi-cers, super-in-tend-ents, and man-agers.	Clerks, etc.		Wage earners.			Total.	16 and over.		Under 16.	Capital.	Salaries and wages.	
					Male.	Fe-male.	Aver-age num-ber.	Number, 15th day of—			Male.	Fe-male.	Male.		Officials.	Clerks, etc.
								Maximum month.	Minimum month.							
United States.....	59	13,777	4	423	540	176	12,025	De 15,585	Mh 9,753	15,651	15,542	72	37	\$42,863,026	\$1,385,596	\$1,045,616
Alabama.....	21	5,767	1	147	265	69	5,285	De 6,948	Fe 3,551	6,948	6,914	34	.....	12,355,071	499,709	477,142
New Jersey.....	8	2,243	.....	97	84	32	2,035	De 2,372	Mh 1,002	2,372	2,368	3	1	8,637,290	238,403	171,945
New York.....	5	350	2	14	14	8	312	No 356	Je 261	353	352	1	.....	1,145,231	73,002	28,003
Pennsylvania.....	7	1,859	.....	55	87	10	1,707	Oc 1,950	Fe 1,429	1,931	1,896	18	17	11,008,421	191,280	120,028
All other states <sup>1</sup> .....	18	3,553	1	110	99	57	3,286	.....	.....	4,047	4,012	16	19	9,707,013	383,202	248,498

STATE.	EXPENSES—continued.						Value of products.	Value added by manufac-ture.	POWER.						
	Salaries and wages—Con.	For contract work.	Rent and taxes.		For materials.				Primary horsepower.					Elec-tric horse-power gener-ated in estab-lish-ments re-port-ing.	
			Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.			Total.	Owned.					
										Steam engines (not tur-bines).	Steam tur-bines.	Inter-nal-com-bus-tion en-gines.	Water pow-er.	Rent-ed (elec-tric).	
United States.....	\$14,705,398	\$37,795	\$20,782	\$1,246,473	\$22,744,779	\$2,041,773	\$50,235,101	\$24,848,549	28,741	10,547	750	4	200	17,240	18,253
Alabama.....	5,776,258	5,413	13,380	453,439	8,381,774	1,079,183	18,784,305	9,323,348	10,754	3,545	.....	.....	.....	7,209	5,841
New Jersey.....	2,655,154	.....	.....	101,546	4,259,465	477,688	9,029,796	4,292,043	3,714	2,447	750	.....	.....	517	4,637
New York.....	372,939	.....	.....	50,382	531,321	53,310	1,342,422	757,791	787	210	.....	.....	.....	557	312
Pennsylvania.....	2,148,431	.....	4,404	406,601	3,837,182	316,810	8,709,771	4,555,779	3,892	1,585	.....	.....	.....	2,307	1,447
All other states <sup>1</sup> .....	3,752,566	32,382	2,968	234,605	5,736,037	714,782	12,368,807	5,918,988	9,614	2,760	.....	4	200	6,650	6,016

<sup>1</sup> All other states embrace: Ohio, 8 establishments; Virginia, 3; Maryland, 2; and 1 each in California, Georgia, Indiana, Massachusetts, North Carolina, Oregon, and Tennessee.

# MACHINERY.

## GENERAL STATISTICS.

**Scope of the industry.**—In this report are presented statistics relating to the manufacture of machinery, machine tools, and textile machinery.

Prior to the census of 1914 the classes of machinery under what is generally known as "factory machinery" had for the most part been included with foundry and machine-shop products, and with a few exceptions separate statistics for the various classes of machinery have not been shown in detail. Statistics were collected at some of the earlier censuses for certain classes of machinery, but the returns were not complete and figures are not comparable.

In 1914 statistics were shown for engines and machinery combined, but in the current census there is a separate bulletin covering the manufacture of engines. Since 1914 separate classes have also been established for machine tools and textile machinery.

The statistics for machinery include those for all establishments reporting the more important and clearly defined classes of machinery for 1919. Only the reports for establishments making the complete machines either as a primary or subsidiary product were considered in compiling the statistics for the various classes of machinery.

**Comparative statistics—principal classes of machinery.**—Table 1 presents data showing the number of establishments engaged in manufacturing each specified class of machinery and the value of product of each class in 1919 and 1914. The data include the products of all establishments engaged chiefly in the manufacture of the specified product, as well as most of those made as subsidiaries of other industries.

A large increase is shown in the value of products in 1919 over that of 1914. This increase, however, was due largely to the general rise of prices following the World War, and does not therefore fairly measure the growth of the industry for the period.

**Principal classes of machinery, by states.**—Table 2 gives, for 1919, the total value of products for the more important classes of machinery and similar data for all states for which figures can be presented without disclosing the operations of individual establishments.

Adding and calculating machines were reported chiefly from Michigan, Illinois, Ohio, New York, and Missouri, ranking in the order named, each state reporting over \$1,000,000 in products.

The manufacture of air compressors was confined chiefly to the states of New York, Pennsylvania, Ohio, and Illinois. New York ranked first and Ohio third, but figures for these states can not be shown without disclosing the operations of individual establishments.

Pennsylvania and Illinois ranked second and fourth, respectively, and, together, produced one-third of the total value of products.

Ammunition machinery was reported largely from states where the greater part of the output was produced by one or two establishments, and therefore can not be shown separately.

Bakers' machinery was manufactured chiefly in the states of Ohio, Illinois, Pennsylvania, New York, and Michigan. Ohio, the leading state, alone produced over 35 per cent of the total output.

Figures for blowers and fans can be shown separately for only two states—Indiana and New York. Massachusetts was the leading state and Michigan second.

Bottling machinery was manufactured to a considerable extent in states where one or two establishments reported a preponderance of the total output. Separate figures can not be shown for this reason for Ohio, the leading state, nor for Iowa, which also reported a large proportion of the output.

The production of brick, pottery, and other clay-working machinery was confined chiefly to the states of Ohio, Illinois, Indiana, Michigan, and New York. Ohio ranked first in this industry, with a total production of \$1,772,241, or 55.6 per cent of the total output.

Ohio produced nearly all of the cash registers and parts, but the figures can not be shown separately without disclosing the operations of individual establishments. Michigan ranked second.

Concrete mixers were manufactured chiefly in Wisconsin, where more than two-fifths of the total value of products were made. Michigan and Ohio ranked second and third, respectively.

Six states reported the manufacture of condensers, but separate figures can be shown for only three states. Pennsylvania ranked first, New Jersey second, and New York third.

The manufacture of cotton gins was largely centralized in the Southern states. The states of Alabama, Georgia, Louisiana, North Carolina, Oklahoma, Tennessee, and Texas had a combined valuation of 88.9 per cent of the total value of products for this industry. Georgia ranked first, with Alabama a close second, these two states combined producing nearly one-half of the total output.

Confectioners' machinery was manufactured chiefly in Massachusetts, Indiana, New York, and Ohio, which ranked first, second, third, and fourth, respectively in the value of products.

In the manufacture of cranes, Ohio was the leading state in the value of the output, with Michigan ranking second and Pennsylvania third.

Dairy machinery (including cream separators and other dairymen's supplies) was manufactured chiefly in New York, this state producing over 43 per cent of the total value of products for the industry. Wisconsin ranked second and Illinois, which is included in "All other states," third. Other states producing a considerable percentage of the output were: Pennsylvania, Missouri, Minnesota, Ohio, Michigan, and Indiana.

Dredging machinery was reported as manufactured in comparatively few states, and figures for the states reporting can not be shown separately.

Elevators and elevator machinery were manufactured chiefly in the states of Illinois, New York, Pennsylvania, Ohio, New Jersey, Minnesota, Wisconsin, and Massachusetts, ranking in the order named, each state reporting over \$1,000,000 in products. These states combined produced an output of over \$63,000,000, or approximately 90 per cent of the total value of products. In the manufacture of electric elevators, New York was the leading state, with Illinois and Pennsylvania ranking second and third, respectively. Elevators, other than electric, were manufactured chiefly in Illinois, New York, Pennsylvania, and Ohio.

Excavating machinery was reported as manufactured in comparatively few states, and figures for only four states can be shown separately. Ohio and Illinois, which ranked first and second, respectively, produced more than one-half of the total value of products.

The manufacture of firearms and ordnance machinery was confined entirely to six states, whose total output amounted to \$2,283,859. Figures can not be shown separately for any of the states reporting.

Flour-mill and gristmill machinery manufacturing was centered in Indiana, Illinois, Pennsylvania, and Ohio. Figures for Indiana, the leading state, can not be shown separately without disclosing individual operations. Illinois, Pennsylvania, and Ohio ranked second, third, and fourth, respectively. These four states combined represented more than one-half of the total value of products for the industry.

Comparatively few states reported the manufacture of glass-making machinery. Figures for only two states—Pennsylvania and Indiana—can be shown separately. A large proportion of the total value of products was in Ohio, which can not be shown.

The manufacture of hydraulic rams was reported by six states, none of which can be shown. Pennsylvania was the leading state and Illinois second.

Laundry machinery, both hand and power, was centralized in Illinois, where approximately one-half

of the total value of products were made. New York and Ohio ranked second and third, respectively.

Ten states reported the manufacture of lawn mowers, but figures for only two states—Indiana and Pennsylvania—can be shown separately. These two states ranked first and second, respectively, and New York third.

Leather-working machinery (other than shoe) was reported chiefly from Massachusetts, where machinery amounting to 49.4 per cent of the total value of products for the industry was manufactured. Delaware and New York ranked next in order.

The manufacture of metal-working machinery, other than machine tools, was distributed chiefly among the states of New York, Ohio, Illinois, Pennsylvania, and Connecticut, each of these states reporting over \$6,000,000 in products, their combined totals representing more than three-fourths of the entire output.

Meters, gas and water, were manufactured chiefly in the states of New York, Pennsylvania, Illinois, New Jersey, and Ohio, these five states producing more than two-thirds of the total value of products.

Three states—Ohio, Pennsylvania, and New Jersey—were reported as the largest manufacturers of mining machinery (exclusive of oil-well machinery); these states combined producing more than 50 per cent of the entire output. The figures for New Jersey can not be shown separately without disclosing the operations of individual establishments.

New York ranked first, Illinois second, and New Jersey third in the manufacture of motion-picture machinery. Separate figures for states can not be shown.

The manufacture of oil-well machinery was centered chiefly in the petroleum-producing states of Pennsylvania, Oklahoma, Texas, Kansas, and California. Ohio and Tennessee manufactured a considerable proportion of this class of machinery, but separate figures for these states can not be shown.

In the manufacture of oil-mill machinery (cottonseed and other) Ohio was the leading state, Kansas, which is included under "All other states," ranked second and Georgia third.

Ore crushers were manufactured chiefly in Massachusetts, Ohio, and Illinois, but the figures can not be shown separately without disclosing the operations of individual establishments.

Massachusetts was the leading state in the manufacture of paper and pulp mill and other machinery used in the paper industry. New York was second and Ohio third.

The manufacture of photo-engraving machinery was confined entirely to four states, the figures for which can not be shown. Illinois was the leading state and New York second.

Printing presses were manufactured chiefly in Illinois, New York, Connecticut, Ohio, and New Jersey, ranking in the order named, each state reporting over \$1,000,000 in products. New York was the leading state in the manufacture of typesetting machines, reporting approximately 80 per cent of the output of this class of printing machinery.

In the manufacture of pumps and pumping machinery New Jersey ranked first, Massachusetts second, New York third, and Pennsylvania fourth. These four states combined contributed more than one-half of the total value of products.

Pennsylvania was the leading state in the manufacture of refrigerating machinery (including ice-making machinery), this state alone producing over 37 per cent of the total value of products. Wisconsin, for which separate data can not be shown, ranked second, and Ohio third.

Reports from Illinois indicate that state to be far in the lead in the manufacture of road-making machines, the value of its products being over \$6,000,000. Ohio was next in rank and New York third.

Rubber-working machinery was manufactured chiefly in Ohio, New Jersey, Connecticut, and Pennsylvania, these states ranking first, second, third, and fifth, respectively. Separate figures can not be shown for Michigan, which was fourth in rank.

Sand-blast machines were reported as manufactured in comparatively few states, and figures can be shown for only one state. Maryland ranked first and Ohio second.

A large proportion of the machinery for sewing machines and parts was centered in New Jersey, but in order to avoid disclosure of individual operations separate figures can not be shown for this state. Illinois was second in rank, with a production of over \$5,000,000.

Shoe machinery was manufactured in only a few states. Massachusetts, which held first place, and Missouri, which ranked second, together reported over nine-tenths of the total value of products.

Separate figures for the manufacture of slot-vending machines can be shown for only two states—Illinois and Ohio. Illinois ranked first, New York second, and Ohio third.

Only four states reported the manufacturing of steam shovels, and figures for only one state—Ohio—can be shown separately.

In the manufacture of mechanical stokers Pennsylvania was the leading state, with a product valued at more than 50 per cent of the total output.

Sugar-mill machinery was manufactured to a considerable extent in states in which one or two establishments reported a preponderance of the total output. Separate figures can not be shown for this reason for Missouri, the leading state. New York, Louisiana, and Pennsylvania ranked second, third, and fourth, respectively.

Tar and oil spreading machines can not be reported separately without disclosure of individual operations.

Typewriters were manufactured chiefly in Connecticut and New York, which ranked first and second, respectively, in value of products. These two states together had over three-fourths of the total output.

Vacuum cleaners can not be shown separately for any of the states. New Jersey and Indiana ranked first and second, respectively, in the value of products.

In the manufacture of washing machines, Illinois led all other states. Pennsylvania ranked second and New York third. These three states together produced approximately 67 per cent of the total output.

Figures for well-drilling machinery can be shown for only three states. Ohio is the leading state, Pennsylvania second, and Iowa third.

Windmills were reported as manufactured chiefly in Illinois, Indiana, and Wisconsin, which ranked first, second, and third, respectively. Illinois reported 47.4 per cent of the entire value of products.

Eight states reported the manufacture of wire-drawing machinery, but separate figures for only one state—Connecticut—can be shown. This state produced 50.4 per cent of the total output.

Oregon was the leading state in the manufacture of sawmill machinery, reporting over 20 per cent of the total value of products for this class. Wisconsin was second in rank; Washington, third; and Tennessee, fourth. Wisconsin ranked first in the manufacture of planing-mill machinery, but separate figures for this state can not be shown. Pennsylvania and New York ranked second and third, respectively. The states of Ohio, New York, and Illinois, together produced more than one-half of the total value of products of woodworking machinery, other than sawmill and planing-mill machinery.

Included in "All other products" are those classes of machinery and machine parts for which manufacturers did not report separately or in detail. Castings, custom work and repairing, and contract work are also listed under this heading. The total value of all products in this group amounted to \$21,139,508.

## MANUFACTURES.

TABLE 1.—COMPARATIVE STATISTICS—PRINCIPAL CLASSES OF MACHINERY: 1919 AND 1914.

CLASS.	Census year.	Number of establishments.	Value.	CLASS.	Census year.	Number of establishments.	Value.
Adding and calculating machines <sup>1</sup> .....	1919 1914	58 44	\$53,993,200 14,784,455	Oil-well machinery.....	1919 1914	89 127	\$28,351,371 10,569,483
Air compressors.....	1919 1914	44 84	18,650,074 5,158,121	Oil-mill machinery, cottonseed and other.....	1919 1914	26 20	11,306,359 1,878,228
Ammunition machinery <sup>2</sup> .....	1919	5	570,138	Ore crushers <sup>3</sup> .....	1919	22	2,367,357
Bakers' machinery.....	1919 1914	68 32	9,358,609 2,554,703	Paper and pulp mill machinery: Paper mill.....	1919 1914	53 .....	11,294,812 (*)
Blowers and fans <sup>2</sup> .....	1919	69	12,141,346	Pulp mill.....	1919 1914	16 .....	1,385,332 (*)
Bottling machinery.....	1919 1914	46 20	10,408,479 1,358,625	Other machinery used in the paper industry.....	1919 1914	100 139	14,740,522 8,588,227
Brick, pottery, and other clay-working machinery...	1919 1914	49 89	3,186,505 2,438,861	Photo-engraving machinery <sup>2</sup> .....	1919	6	732,941
Cash registers and parts of <sup>1</sup> .....	1919 1914	21 19	31,574,453 15,935,069	Printing machinery: Presses.....	1919 1914	58 88	18,433,829 8,396,508
Concrete mixers.....	1919 1914	62 44	10,450,344 2,956,058	Typesetting machines <sup>6</sup> .....	1919 1914	9 10	14,878,337 7,634,631
Condensers <sup>2</sup> .....	1919	19	24,216,404	All other <sup>5</sup> .....	1919 1914	102 56	20,012,797 3,197,319
Cotton gins.....	1919 1914	25 25	10,175,935 4,901,680	Pumps and pumping machinery <sup>1</sup> .....	1919 1914	222 298	69,456,444 27,456,916
Confectioners' machinery <sup>2</sup> .....	1919	53	9,341,394	Refrigerating machinery: Ice making.....	1919 1914	48 .....	15,654,736 (*)
Cranes: Electric.....	1919 1914	36 .....	27,324,864 (*)	Other refrigerating.....	1919 1914	46 73	15,002,314 10,522,322
Hydraulic and steam.....	1919 1914	16 .....	13,972,133 (*)	Road-making machines.....	1919 1914	58 31	15,777,652 3,545,272
All other.....	1919 1914	59 26	11,237,025 4,194,457	Rubber-working machinery.....	1919 1914	71 14	17,001,019 2,725,897
Dairy machinery <sup>1</sup> .....	1919 1914	140 78	34,278,793 12,995,374	Sand-blast machines <sup>2</sup> .....	1919	15	1,319,903
Dredging machinery <sup>4</sup> .....	1919	9	1,824,025	Sewing machines and parts <sup>1</sup> .....	1919 1914	40 48	43,694,919 21,710,643
Elevators and elevator machinery: Electric.....	1919 1914	94 .....	29,607,380 (*)	Shoe machinery.....	1919 1914	61 72	16,260,941 5,949,300
All other.....	1919 1914	157 213	40,579,919 17,228,101	Slot-vending machines <sup>2</sup> .....	1919	26	1,646,231
Excavating machinery.....	1919 1914	38 21	7,284,333 4,296,965	Steam shovels.....	1919 1914	8 .....	12,453,763 (*)
Firearms and ordnance machinery <sup>2</sup> .....	1919	10	2,283,859	Stokers, mechanical <sup>1</sup> .....	1919	13	4,280,236
Flour-mill and gristmill machinery.....	1919 1914	106 101	19,980,816 5,017,761	Sugar-mill machinery <sup>1</sup> .....	1919 1914	56 42	14,847,346 1,971,543
Glass-making machinery.....	1919 1914	24 30	3,316,139 1,090,726	Typewriters <sup>1</sup> .....	1919 1914	39 53	43,313,319 20,516,532
Hydraulic rams <sup>2</sup> .....	1919	10	3,596,963	Vacuum cleaners: Electric.....	1919 1914	3 .....	299,385 (*)
Laundry machinery: Power machines.....	1919 1914	32 73	10,800,948 6,135,321	All other.....	1919 1914	10 39	1,941,338 2,058,524
All other.....	1919 1914	27 35	3,090,340 1,429,958	Washing machines <sup>2</sup> .....	1919	115	142,895,929
Lawn mowers.....	1919 1914	19 22	3,777,233 2,848,119	Well-drilling machinery, other than oil well <sup>2</sup> .....	1919	30	2,560,668
Leather-working machinery, other than shoe.....	1919 1914	51 27	4,691,431 1,006,939	Windmills <sup>1</sup> .....	1919 1914	32 50	9,933,085 5,842,778
Metal-working machinery, other than machine tools..	1919 1914	211 277	57,541,482 17,419,526	Wire-drawing machinery <sup>2</sup> .....	1919	20	1,402,049
Meters, gas and water <sup>1</sup> .....	1919 1914	111 40	27,764,884 11,638,074	Woodworking machinery: Sawmill.....	1919 1914	89 182	15,038,945 6,303,920
Mining machinery.....	1919 1914	133 163	51,243,489 13,253,634	Planing mill.....	1919 1914	34 .....	6,732,247 (*)
Motion-picture machinery <sup>2</sup> .....	1919	23	3,605,691	All other.....	1919 1914	146 190	14,992,183 7,088,980

<sup>1</sup> Includes value of all products of establishments engaged primarily in the manufacture of the machines specified.<sup>2</sup> Figures not available for 1914.<sup>3</sup> Not reported separately.<sup>4</sup> Dredges and steam shovels, reported under "Excavating machinery," 1914.<sup>5</sup> Includes linotype and other for 1914.<sup>6</sup> Printing and bookbinding machinery (other than printing presses).<sup>7</sup> The amount reported includes, presumably, only machinery specially designed for sugar mills and not otherwise available, and does not include large amounts of sugar-mill equipment, such as boilers, tanks, kettles, etc.

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TABLE 2.—PRINCIPAL CLASSES OF MACHINERY, BY STATES: 1919.

CLASS AND STATE.	Value of products.	CLASS AND STATE.	Value of products.	CLASS AND STATE.	Value of products.
Adding and calculating machines.....	\$53,993,200	Elevators and elevator machinery.....	\$70,187,299	Mining machinery, exclusive of oil-well machinery.....	\$51,243,489
Ohio.....	2,399,134	Electric.....	29,607,380	Ohio.....	11,833,544
Missouri.....	1,156,564	New York.....	7,900,804	Pennsylvania.....	10,534,040
All other states.....	50,437,502	Illinois.....	6,439,300	Colorado.....	3,039,642
Air compressors.....	18,650,074	Pennsylvania.....	5,292,787	Illinois.....	2,025,719
Pennsylvania.....	5,229,202	New Jersey.....	5,279,647	Missouri.....	930,661
Illinois.....	836,727	Ohio.....	1,139,899	California.....	911,095
All other states.....	12,584,145	Minnesota.....	1,026,153	Indiana.....	535,520
Ammunition machinery.....	570,138	Massachusetts.....	930,141	Tennessee.....	466,160
Bakers' machinery.....	9,358,609	Michigan.....	246,068	New York.....	325,030
Ohio.....	3,353,045	California.....	108,087	All other states.....	20,640,248
Illinois.....	1,054,311	All other states.....	1,237,834	Motion-picture machinery.....	3,605,591
Pennsylvania.....	1,831,880	Illinois.....	40,579,919	Oil-well machinery.....	28,351,371
New York.....	909,438	Ohio.....	8,642,341	Pennsylvania.....	6,715,013
Michigan.....	471,883	Ohio.....	6,915,589	Oklahoma.....	5,456,607
All other states.....	1,277,152	Pennsylvania.....	5,122,951	Texas.....	4,044,161
Blowers and fans.....	12,141,345	Minnesota.....	4,022,122	Kansas.....	2,146,422
Indiana.....	1,781,295	New York.....	3,708,753	California.....	1,393,356
New York.....	845,860	Wisconsin.....	3,587,651	Louisiana.....	797,490
All other states.....	9,514,191	Massachusetts.....	534,660	Illinois.....	179,699
Bottling machinery.....	10,408,479	Michigan.....	15,747	All other states.....	7,619,620
Wisconsin.....	1,133,069	All other states.....	8,030,105	Oil-mill machinery, cottonseed and other.....	11,306,369
New York.....	620,335	Excavating machinery.....	7,284,333	Ohio.....	4,957,587
Illinois.....	451,068	Ohio.....	2,551,346	Georgia.....	1,619,482
All other states.....	8,264,007	Illinois.....	1,710,952	Massachusetts.....	276,376
Brick, pottery, and other clay-working machinery.....	3,186,505	Minnesota.....	633,113	All other states.....	4,452,914
Ohio.....	1,772,241	California.....	149,800	Ore crushers.....	2,367,357
Illinois.....	173,184	All other states.....	2,230,122	Colorado.....	216,290
Indiana.....	131,698	Firearms and ordnance machinery.....	2,232,859	All other states.....	2,151,067
Michigan.....	115,306	Flour-mill and gristmill machinery.....	19,980,816	Paper and pulp mill machinery.....	27,420,008
New York.....	41,431	Illinois.....	2,907,758	Paper mill.....	11,294,812
All other states.....	952,645	Pennsylvania.....	2,745,080	Massachusetts.....	3,373,357
Cash registers and parts of.....	31,674,453	Ohio.....	2,332,783	New York.....	1,782,940
Michigan.....	923,948	New York.....	1,576,693	Pennsylvania.....	1,285,555
All other states.....	30,650,505	Kansas.....	669,791	All other states.....	4,853,180
Concrete mixers.....	10,450,344	Missouri.....	621,603	Pulp-mill.....	1,885,332
Wisconsin.....	4,642,360	North Carolina.....	442,820	New York.....	600,162
Michigan.....	1,018,823	California.....	189,609	Massachusetts.....	240,022
Ohio.....	785,582	Nebraska.....	135,661	All other states.....	545,148
Illinois.....	600,853	All other states.....	8,359,009	Other machinery used in the paper industry.....	14,740,522
Pennsylvania.....	607,713	Glass-making machinery.....	3,316,139	New York.....	4,189,965
Indiana.....	29,525	Pennsylvania.....	1,033,555	Massachusetts.....	4,132,239
All other states.....	2,885,488	Indiana.....	128,603	Ohio.....	2,670,401
Condensers.....	24,216,404	All other states.....	2,103,981	Illinois.....	713,803
New Jersey.....	3,951,685	Hydraulic rams.....	3,596,963	Connecticut.....	365,558
New York.....	2,999,008	Laundry machinery.....	13,891,288	Missouri.....	179,674
Michigan.....	904,179	Power.....	10,800,948	California.....	39,730
All other states.....	16,061,532	Illinois.....	5,834,261	Michigan.....	24,973
Cotton gins.....	10,175,936	Massachusetts.....	184,788	All other states.....	2,628,063
Georgia.....	2,436,326	All other states.....	4,781,899	Photo-engraving machinery.....	732,941
Alabama.....	2,268,669	Other.....	3,090,340	Printing machinery.....	53,324,973
All other states.....	5,470,941	New York.....	1,531,916	Presses.....	18,433,839
Confectioners' machinery.....	9,341,394	Ohio.....	411,552	Illinois.....	6,496,309
New York.....	1,261,080	All other states.....	1,146,872	New York.....	5,835,633
Ohio.....	837,354	Lawn mowers.....	3,777,233	Connecticut.....	1,991,668
Connecticut.....	25,278	Indiana.....	1,371,276	Ohio.....	1,551,718
Pennsylvania.....	14,082	Pennsylvania.....	707,061	New Jersey.....	1,253,322
All other states.....	7,202,700	All other states.....	1,698,896	Massachusetts.....	1,842,781
Cranes.....	52,534,022	Leather-working machinery, other than shoe.....	4,691,431	All other states.....	1,700,153
Electric.....	27,324,864	Massachusetts.....	2,318,139	Typesetting machines.....	14,578,337
Ohio.....	17,062,240	Delaware.....	838,848	Other.....	20,012,797
Michigan.....	2,186,841	New York.....	550,729	New York.....	6,518,091
Pennsylvania.....	1,347,212	Wisconsin.....	395,766	Illinois.....	5,969,275
All other states.....	6,728,571	Pennsylvania.....	216,579	Pennsylvania.....	3,828,345
Steam and hydraulic.....	13,972,133	All other states.....	371,370	New Jersey.....	1,552,187
Ohio.....	7,526,891	Metal-working machinery, other than machine tools.....	57,541,482	Connecticut.....	843,201
All other states.....	6,445,242	New York.....	10,770,544	Ohio.....	165,044
All other cranes.....	11,237,025	Ohio.....	10,192,199	All other states.....	1,130,554
Ohio.....	6,496,914	Illinois.....	9,445,316	Pumps and pumping machinery.....	66,456,444
Pennsylvania.....	408,997	Pennsylvania.....	9,413,411	New Jersey.....	14,216,368
Illinois.....	408,588	Connecticut.....	6,993,973	Massachusetts.....	10,502,421
All other states.....	3,922,526	New Jersey.....	2,911,832	New York.....	9,627,016
Dairy machinery.....	34,278,793	California.....	650,472	Pennsylvania.....	7,159,779
New York.....	14,795,315	Indiana.....	376,817	Illinois.....	4,804,807
Wisconsin.....	4,359,774	Wisconsin.....	340,792	California.....	4,107,013
Pennsylvania.....	2,073,216	Maryland.....	104,933	Ohio.....	3,709,005
Missouri.....	811,854	All other states.....	6,341,193	Indiana.....	3,348,689
Minnesota.....	705,154	Meters, gas and water.....	27,764,884	Michigan.....	2,183,362
Ohio.....	587,518	New York.....	6,493,607	Iowa.....	1,408,060
Michigan.....	547,499	Pennsylvania.....	5,731,811	Missouri.....	149,219
Indiana.....	480,001	Illinois.....	2,963,647	Texas.....	134,020
All other states.....	9,918,462	New Jersey.....	2,102,071	All other states.....	5,206,625
Dredging machinery.....	1,824,025	Ohio.....	1,934,405		
		All other states.....	8,504,343		

## MANUFACTURES.

TABLE 2.—PRINCIPAL CLASSES OF MACHINERY, BY STATES: 1919—Continued.

CLASS AND STATE.	Value of products.	CLASS AND STATE.	Value of products.	CLASS AND STATE.	Value of products.
Refrigerating machinery.....	\$30,667,050	Steam shovels.....	\$12,453,763	Wire-drawing machinery.....	\$1,402,049
Ice making.....	15,664,736	Ohio.....	5,048,759	Connecticut.....	707,921
Pennsylvania.....	3,846,857	All other states.....	7,405,004	All other states.....	694,128
Ohio.....	2,885,136	Stokers, mechanical.....	4,280,236	Woodworking machinery.....	36,763,375
Missouri.....	996,311	Pennsylvania.....	2,890,052	Sawmill.....	15,038,945
Illinois.....	670,673	All other states.....	1,390,184	Oregon.....	3,204,590
California.....	307,091	Sugar-mill machinery.....	14,847,346	Wisconsin.....	3,165,393
All other states.....	7,378,768	New York.....	2,702,184	Washington.....	1,570,780
Other refrigerating.....	15,002,314	Louisiana.....	2,183,716	Tennessee.....	1,029,779
Illinois.....	1,530,893	Pennsylvania.....	1,287,090	Ohio.....	1,007,944
All other states.....	13,471,426	Colorado.....	235,568	Michigan.....	978,487
Road-making machines.....	15,777,652	Illinois.....	22,267	Minnesota.....	504,678
Illinois.....	6,256,329	All other states.....	8,411,521	Mississippi.....	252,150
Ohio.....	2,698,002	Typewriters.....	43,313,319	Indiana.....	234,361
New York.....	1,900,509	Connecticut.....	16,961,254	Pennsylvania.....	224,713
Minnesota.....	1,487,900	New York.....	15,760,668	Maine.....	187,238
All other states.....	3,434,903	New Jersey.....	938,661	Massachusetts.....	110,552
Rubber-working machinery.....	17,001,919	All other states.....	9,652,736	All other states.....	2,568,271
Ohio.....	5,898,439	Vacuum cleaners, electric and other.....	2,240,723	Planing mill.....	6,732,247
New Jersey.....	3,437,085	Ohio.....	510,521	Pennsylvania.....	1,573,515
Connecticut.....	3,179,072	All other states.....	1,730,202	New York.....	486,061
Pennsylvania.....	1,075,625	Washing machines.....	42,895,929	All other states.....	4,672,071
Illinois.....	568,845	Illinois.....	14,657,190	Other.....	14,992,183
Massachusetts.....	456,557	Pennsylvania.....	3,940,551	Ohio.....	4,774,610
New York.....	111,030	New York.....	3,239,147	New York.....	2,069,677
All other states.....	2,275,266	Ohio.....	2,988,510	Illinois.....	1,761,548
Sand-blast machines.....	1,319,903	Missouri.....	2,900,058	Massachusetts.....	1,456,607
Ohio.....	270,171	Michigan.....	964,732	Michigan.....	1,377,410
All other states.....	1,049,732	Indiana.....	880,907	Wisconsin.....	913,207
Sewing machines and parts.....	43,694,919	Wisconsin.....	615,737	Minnesota.....	465,681
Illinois.....	7,166,783	All other states.....	12,709,037	Pennsylvania.....	220,848
New York.....	1,104,345	Well-drilling machinery.....	2,566,668	Indiana.....	146,301
All other states.....	35,423,791	Ohio.....	1,407,775	All other states.....	1,806,231
Shoe machinery.....	18,260,941	Iowa.....	239,417	All other products.....	21,139,508
Massachusetts.....	12,828,311	Texas.....	49,736		
Missouri.....	1,968,041	All other states.....	860,740		
New York.....	266,233	Windmills.....	9,933,085		
All other states.....	1,198,356	Illinois.....	4,715,045		
Slot-vending machines.....	1,646,231	Indiana.....	1,556,315		
Illinois.....	640,643	Wisconsin.....	895,495		
Ohio.....	246,516	All other states.....	2,706,230		
All other states.....	769,072				

# TEXTILE MACHINERY.

## GENERAL STATISTICS.

**General character of the industry.**—This report presents statistics for the manufacture of textile machinery in the United States in 1919. Prior to this census separate statistics were not shown for this industry, the figures being included with those for foundry and machine shops.

The textile machinery manufactured by establishments here considered may be subdivided into four principal classes: (1) Machinery for working raw stock, and all subsequent machinery used in textile mills in preparing yarn for weaving, knitting, etc.; (2) fabric machinery; (3) machinery for converting and finishing yarn and fabric; and (4) extra parts and attachments. Statistics for the four classes combined are herein presented, one of the tables giving separate figures for each group as well.

A considerable proportion of the total output of textile machinery is produced by establishments engaged primarily in the manufacture of other products. The value of such manufactures—\$3,611,676—however, is not included in the total value of products shown for the textile-machinery industry.

**Summary for the industry.**—Table 3 summarizes the statistics of the textile-machinery manufacturing industry for 1919. The data include the total product of establishments engaged chiefly in the manufacture of textile machinery, but exclude those made as subsidiary products of other industries.

**Principal states, ranked by value of products.**—Table 4 presents the more important statistics of the industry, by states, the states being ranked according to value of products reported for 1919.

The textile-machinery industry is confined to 23 states, all being located east of the Mississippi River. The industry is largely centralized in the New England and Middle Atlantic states, the combined valuation of these sections being 97.6 per cent of the total value of products for the industry in 1919. The industry in the Southern states is represented by 41 establishments, located in North Carolina, South Carolina, Georgia, Tennessee, Alabama, Kentucky, Maryland, and Virginia.

Massachusetts is the leading state in the industry. The value of its product is more than one-half of the total value of textile machinery manufactured in the United States, and the number of wage earners employed in the industry in the state represents 54.7 per cent of the total number of wage earners. Rhode Island and Pennsylvania are second and third, respectively, in importance, the former contributing 12.2

per cent of the value of products and 11.9 per cent of the wage earners, while the latter state contributed 11.8 per cent and 11.6 per cent, respectively, of these two items.

**Persons engaged in the industry.**—Table 5 shows, for 1919, the number of persons engaged in the industry, distributed by sex, and the average number of wage earners, distributed by age also. The sex and age classification of the average number of wage earners in this table is an estimate obtained by the method described in the "Explanation of terms."

The number of males engaged in the industry in 1919 was greatly in excess of the number of females, the proportion which the two sexes formed of the total being 91.5 per cent and 8.5 per cent, respectively. Of the total average number of wage earners employed in 1919, 93.7 per cent were males and 6.3 per cent females.

**Wage earners, by months.**—Table 6 gives the total average number of wage earners employed in the textile-machinery industry together with the number employed on the 15th (or nearest representative day) of each month during the year 1919 for each state for which figures can be shown separately, together with the percentages in each state which the minimum number forms of the maximum reported for any month.

The states shown in the table vary considerably in the season of greatest activity. In Massachusetts, where more than one-half of the total number of wage earners in the textile-machinery industry are employed, October was the month of greatest and April the month of least employment. Maine, New York, and Pennsylvania employed the greatest number in December and the least in January.

**Prevailing hours of labor.**—In Table 7 the average number of wage earners reported for 1919 for the industry has been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. More than three-fourths of the wage earners employed in the textile-machinery industry in 1919 were in establishments operating 54 hours or fewer per week, 42.4 per cent of the total being employed in establishments where the prevailing hours were between 48 and 54 per week.

**Size of establishments, by average number of wage earners.**—Table 8 shows the size of establishments in 1919 as measured by the number of wage earners employed.



Of the 432 establishments engaged in the industry, 20 employed no wage earners. These were small plants in which the work was done by proprietors and firm members. The small establishments (those employing from 1 to 50 wage earners) greatly predominate, this class constituting 73.8 per cent of the total number of establishments reporting, while only 4,199, or 13.2 per cent of the total average number of wage earners, were employed therein. The classes "251 to 500," "501 to 1,000," and "Over 1,000," comprising 23 establishments, employed 20,070 wage earners, or 63.1 per cent of the total average number, illustrating the tendency of the industry to become concentrated in a few large establishments.

**Size of establishments, by value of products.**—Of the 432 establishments reported for 1919, as shown in Table 9, 26, or 6 per cent, reported products valued at \$1,000,000 or over. While such establishments represented a small proportion of the total number, they reported more than three-fifths of the total value of products.

On the other hand, the small establishments—that is, those having products valued at less than \$20,000—constituted 27.8 per cent of the total number of establishments, but the value of their products represented only nine-tenths of 1 per cent of the total. The great bulk of manufactures was reported by plants having products valued at \$100,000 or over, such establishments reporting 92.8 per cent of the total value.

**Character of ownership.**—Table 10 presents statistics concerning the character of ownership, or legal organization, of the establishments in the industry for 1919.

The table indicates the predominance of the corporate form of ownership. Corporations owned 46.8 per cent of the total number of establishments for the industry in 1919, employed 90.8 per cent of the total average number of wage earners, and reported 91.3 per cent of the total value of products.

**Number and horsepower of types of prime movers.**—Table 11 shows, for 1919, the number and total horsepower of engines or motors employed in generating power (including electric motors operated by purchased current). It also shows separately the number and horsepower of electric motors operated by current generated in the establishments reporting.

The total primary horsepower reported for the industry amounted to 41,997 horsepower. Steam power constituted 48.2 per cent of the total; 23,704 horsepower, or 56.4 per cent of the total primary horsepower, was owned by establishments reporting.

**Fuel consumed.**—Table 12 shows the principal kinds of fuel used for the industry in 1919, and also gives separately the amounts consumed in states requiring considerable quantities of fuel for this industry.

Bituminous coal was the principal fuel used in the industry in 1919, 91,551 tons being reported, of which the establishments in Massachusetts consumed a fraction less than two-thirds. Massachusetts was also the principal consumer of coke and gas, while 55.8 per cent of the oil was used in Rhode Island. Pennsylvania was the largest consumer of anthracite coal, reporting 24.9 per cent of the total amount of this kind of coal used by the industry in 1919.

TABLE 3.—SUMMARY: 1919.

	Number or amount.		Number or amount.
Number of establishments.....	432	Salaries and wages.....	\$44,627,499
Persons engaged.....	36,126	Salaries.....	8,098,770
Proprietors and firm members.....	354	Wages.....	36,528,729
Salaried employees.....	3,940	Paid for contract work.....	178,686
Wage earners (average number).....	31,823	Rent and taxes.....	6,502,215
Primary horsepower.....	41,997	Cost of materials.....	45,636,628
Capital.....	\$129,797,903	Value of products.....	122,089,264
		Value added by manufacture <sup>1</sup> .....	76,452,636

<sup>1</sup> Value of products less cost of materials.

TABLE 4.—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.			STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
		Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.			Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.
United States..	432	31,823	100.0	....	\$122,089	100.0	....	\$76,453	100.0	...	Connecticut.....	23	669	2.1	8	\$2,876	2.4	8	\$1,792	2.3	8
Massachusetts....	116	17,413	54.7	1	65,901	54.0	1	42,424	55.5	1	North Carolina....	14	305	1.0	9	1,159	0.9	9	588	0.8	9
Rhode Island.....	60	3,776	11.9	2	14,842	12.2	2	9,168	12.0	2	Vermont.....	14	243	0.8	10	722	0.6	10	456	0.6	10
Pennsylvania.....	64	3,705	11.6	3	14,355	11.8	3	8,004	11.3	3	South Carolina....	6	134	0.4	11	615	0.5	11	331	0.4	11
New Hampshire....	11	1,109	3.5	6	6,223	5.1	4	3,753	4.9	4	Georgia.....	6	94	0.3	13	378	0.3	12	188	0.2	13
Maine.....	10	1,732	5.4	4	6,135	5.0	4	3,518	4.6	5	Tennessee.....	4	16	0.1	16	88	0.1	16	38	(?)	19
New Jersey.....	58	1,672	5.3	5	5,003	4.1	5	3,172	4.2	6	Alabama.....	4	17	0.1	18	67	0.1	19	16	(?)	20
New York.....	30	706	2.2	7	2,933	2.4	7	1,858	2.4	7	All other states....	11	232	0.7	....	792	0.6	....	547	0.7	...

<sup>1</sup> Less than one-tenth of 1 per cent.

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TABLE 5.—PERSONS ENGAGED IN THE INDUSTRY: 1919.

CLASS.	Total.	Male.	Fe- male.	PER CENT OF TOTAL.		CLASS.	Total.	Male.	Fe- male.	PER CENT OF TOTAL.	
				Male.	Fe- male.					Male.	Fe- male.
All classes.....	36,126	33,066	3,060	91.5	8.5	Clerks and other subordinate salaried em- ployees.....	2,719	1,714	1,005	63.0	37.0
Proprietors and officials.....	1,584	1,525	59	96.3	3.7	Wage earners (average number).....	31,823	29,827	1,996	93.7	6.3
Proprietors and firm members.....	354	327	27	92.4	7.6	16 years of age and over.....	31,399	29,463	1,936	93.8	6.2
Salaried officers of corporations.....	390	370	20	94.9	5.1	Under 16 years of age.....	424	364	60	85.8	14.2
Superintendents and managers.....	840	828	12	98.6	1.4						

TABLE 6.—WAGE EARNERS, BY MONTHS, FOR SELECTED STATES: 1919.

[The month of maximum employment is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Average number em- ployed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent min- imum is of maxi- mum.
		Janu- ary.	Febru- ary.	March.	April.	May.	June.	July.	August.	Septem- ber.	Octo- ber.	Novem- ber.	Decem- ber.	
United States.....	31,823	30,296	29,630	29,138	<b>28,898</b>	29,503	30,706	32,458	32,904	33,981	34,361	34,577	<b>35,426</b>	81.6
Males.....	29,827	28,209	27,676	27,173	<b>26,967</b>	27,552	28,759	30,495	30,933	32,020	32,338	32,473	<b>33,329</b>	80.9
Females.....	1,996	2,087	1,954	1,965	<b>1,931</b>	1,951	1,947	1,961	1,971	1,961	2,023	2,104	2,097	91.8
Alabama.....	17	8	8	8	19	20	21	20	20	20	20	20	20	38.1
Connecticut.....	669	645	641	688	696	703	675	695	697	692	<b>558</b>	638	700	79.4
Georgia.....	94	98	94	83	93	94	94	94	94	94	94	94	94	96.9
Maine.....	1,732	<b>1,805</b>	1,638	1,607	1,658	1,675	1,721	1,715	1,769	1,778	1,812	1,902	<b>1,904</b>	84.3
Massachusetts.....	17,413	16,740	16,181	15,737	<b>16,399</b>	15,780	16,706	17,739	18,226	19,082	19,297	18,816	19,258	79.8
New Hampshire.....	1,109	1,040	1,047	<b>1,007</b>	1,069	1,031	1,041	1,116	1,164	1,152	1,165	1,228	<b>1,248</b>	80.7
New Jersey.....	1,672	1,593	1,583	1,648	1,704	1,746	1,785	1,879	1,486	<b>1,485</b>	1,559	1,707	<b>1,886</b>	78.7
New York.....	706	<b>650</b>	637	656	647	651	668	691	738	753	767	802	826	77.0
North Carolina.....	305	305	304	307	300	<b>298</b>	300	303	<b>298</b>	301	308	318	<b>318</b>	93.7
Pennsylvania.....	3,705	<b>3,276</b>	3,303	3,359	3,388	3,505	3,565	3,719	3,842	3,961	3,926	<b>4,229</b>	<b>4,387</b>	74.7
Rhode Island.....	3,776	3,695	3,528	3,384	<b>3,316</b>	3,403	3,536	3,867	3,953	4,032	4,195	<b>4,236</b>	<b>4,167</b>	78.3
South Carolina.....	134	144	149	138	131	133	132	<b>120</b>	129	125	134	134	139	80.5
Tennessee.....	16	17	17	14	14	<b>12</b>	18	16	16	14	18	19	18	63.2
Vermont.....	243	<b>222</b>	227	232	232	237	241	255	264	260	244	247	255	84.1

TABLE 7.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR SELECTED STATES: 1919.

STATE.	Total.	IN ESTABLISHMENTS WHERE THE PREVAIL- ING HOURS OF LABOR PER WEEK WERE—						STATE.	Total.	IN ESTABLISHMENTS WHERE THE PREVAIL- ING HOURS OF LABOR PER WEEK WERE—					
		44 and under.	Be- tween 44 and 48.	48.	Be- tween 48 and 54.	54.	Be- tween 54 and 60.			44 and under.	Be- tween 44 and 48.	48.	Be- tween 48 and 54.	54.	Be- tween 54 and 60.
United States.....	31,823	775	196	9,939	13,483	1,608	4,602	1,130	New Jersey.....	1,672	593	74	118	796	38
Alabama.....	17	1	.....	2	.....	8	6	.....	New York.....	706	134	51	85	222	158
Connecticut.....	669	1	.....	93	460	17	88	.....	North Carolina.....	305	.....	.....	.....	.....	89
Georgia.....	94	.....	.....	.....	.....	73	21	.....	Pennsylvania.....	3,705	8	.....	565	1,335	283
Maine.....	1,732	.....	1,445	64	223	.....	.....	.....	Rhode Island.....	3,776	25	71	360	2,854	208
Massachusetts.....	17,413	13	6,236	7,399	510	3,224	31	.....	South Carolina.....	134	.....	.....	19	.....	70
New Hampshire.....	1,109	.....	1,013	.....	22	62	12	.....	Tennessee.....	16	.....	6	.....	.....	4
									Vermont.....	243	.....	15	168	51	.....

## MANUFACTURES.

TABLE 8.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR SELECTED STATES: 1919.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—																
	Establishments.	Wage earners (average number).	No wage earners.	1 to 5 wage earners, inclusive.		6 to 20 wage earners, inclusive.		21 to 50 wage earners, inclusive.		51 to 100 wage earners, inclusive.		101 to 250 wage earners, inclusive.		251 to 500 wage earners, inclusive.		501 to 1,000 wage earners, inclusive.		Over 1,000 wage earners.	
			Establishments.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.
United States.....	432	31,823	20	108	292	141	1,556	70	2,351	39	2,749	31	4,805	10	3,444	7	5,234	6	11,392
Alabama.....	4	17	.....	2	3	2	14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Connecticut.....	23	669	2	11	27	6	67	2	71	1	64	.....	.....	1	440	.....	.....	.....	.....
Georgia.....	9	84	1	1	1	6	63	1	30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maine.....	10	1,732	2	3	7	1	7	.....	.....	2	180	1	116	.....	.....	.....	.....	.....	.....
Massachusetts.....	116	17,413	1	29	91	32	356	16	503	13	916	14	2,240	3	995	3	2,362	1	1,442
New Hampshire.....	11	1,109	.....	1	2	4	38	2	62	1	57	2	289	.....	.....	.....	.....	.....	.....
New Jersey.....	56	1,672	4	17	48	18	228	9	332	4	326	3	456	1	282	1	661	.....	.....
New York.....	30	706	4	6	13	11	122	5	156	2	169	2	246	.....	.....	.....	.....	.....	.....
North Carolina.....	14	305	.....	4	10	4	47	5	188	1	60	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania.....	64	3,705	2	16	39	18	206	15	568	3	171	7	1,202	2	783	1	736	.....	.....
Rhode Island.....	60	3,776	3	8	26	25	249	8	220	9	606	2	256	3	944	2	1,475	.....	.....
South Carolina.....	6	134	.....	3	7	1	16	1	45	1	66	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee.....	4	16	1	2	10	1	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vermont.....	14	243	.....	1	1	10	104	2	53	1	85	.....	.....	.....	.....	.....	.....	.....	.....

TABLE 9.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919.

VALUE OF PRODUCT.	Number of establishments.	Average number of wage earners.	Value of products.	Value added by manufacture.	VALUE OF PRODUCT.	Number of establishments.	Average number of wage earners.	Value of products.	Value added by manufacture.
All classes.....	432	31,823	122,089,264	76,452,036	Per cent distribution.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	40	31	103,972	70,538	Less than \$5,000.....	9.3	0.1	0.1	0.1
\$5,000 to \$20,000.....	80	287	1,003,552	603,082	\$5,000 to \$20,000.....	18.5	0.9	0.8	0.8
\$20,000 to \$100,000.....	166	2,161	7,075,721	4,295,006	\$20,000 to \$100,000.....	38.4	6.8	6.3	5.6
\$100,000 to \$500,000.....	100	5,562	22,360,035	13,403,294	\$100,000 to \$500,000.....	23.1	17.5	18.3	17.5
\$500,000 to \$1,000,000.....	20	3,371	14,301,083	8,578,622	\$500,000 to \$1,000,000.....	4.6	10.6	11.7	11.2
\$1,000,000 and over.....	26	20,411	76,644,301	49,500,894	\$1,000,000 and over.....	6.0	64.1	62.8	64.7

TABLE 10.—CHARACTER OF OWNERSHIP, BY SELECTED STATES: 1919.

STATE.	NUMBER OF ESTABLISHMENTS OWNED BY—			AVERAGE NUMBER OF WAGE EARNERS.									VALUE OF PRODUCTS.								
	Indi-vid-u-als.	Cor-pora-tions.	All oth-ers.	Total.	In establishments owned by—			Per cent of total.			Total.	Of establishments owned by—			Per cent of total.						
					Indi-vid-u-als.	Cor-pora-tions.	All oth-ers.	Indi-vid-u-als.	Cor-pora-tions.	All oth-ers.		Indi-vid-u-als.	Cor-pora-tions.	All oth-ers.	Indi-vid-u-als.	Cor-pora-tions.	All oth-ers.				
United States.....	154	202	76	31,823	1,696	28,895	1,232	5.3	90.8	3.9	\$122,089,264	\$6,197,967	\$111,446,119	\$4,445,178	5.1	91.3	3.6				
Alabama.....	3	.....	1	17	17	.....	.....	100.0	.....	.....	66,911	166,911	.....	.....	100.0	.....	.....				
Connecticut.....	.....	8	7	669	23	621	25	3.4	92.8	3.7	2,875,689	143,188	2,609,017	123,484	5.0	90.7	4.3				
Georgia.....	6	3	.....	94	35	59	.....	37.2	62.8	.....	377,589	144,545	233,044	.....	38.3	61.7	.....				
Maine.....	4	4	2	1,732	115	1,717	.....	0.9	99.1	.....	6,134,677	167,627	6,067,050	.....	1.1	98.9	.....				
Massachusetts.....	30	62	15	17,413	487	16,678	248	2.8	95.8	1.4	65,901,370	1,799,735	62,977,828	1,123,807	2.7	95.6	1.7				
New Hampshire.....	2	7	2	1,109	.....	1,054	255	.....	95.0	5.0	6,222,552	.....	6,068,741	153,811	.....	97.5	2.5				
New Jersey.....	26	20	10	1,672	483	922	267	28.9	55.1	16.0	5,002,932	1,396,373	2,840,733	765,826	27.9	56.8	15.3				
New York.....	11	14	5	706	81	499	126	11.5	70.7	17.8	2,933,308	252,961	2,209,609	470,738	8.6	75.3	16.0				
North Carolina.....	2	9	3	305	.....	238	217	.....	94.4	5.6	1,159,277	.....	1,021,771	137,506	.....	88.1	11.9				
Pennsylvania.....	18	31	15	3,705	132	3,348	225	3.6	90.4	6.1	14,354,753	577,880	12,904,514	872,359	4.0	89.9	6.1				
Rhode Island.....	23	32	5	3,776	278	3,385	113	7.4	89.6	3.0	14,842,179	1,172,263	13,297,607	372,309	7.9	89.6	2.5				
South Carolina.....	2	2	2	134	.....	134	.....	100.0	.....	.....	614,758	.....	614,758	.....	.....	100.0	.....				
Tennessee.....	2	2	.....	16	.....	16	.....	100.0	.....	.....	88,112	.....	88,112	.....	.....	100.0	.....				
Vermont.....	5	3	6	243	56	101	86	23.0	41.6	35.4	722,180	180,702	318,455	223,023	25.0	44.1	30.9				

<sup>1</sup> Includes the group "All others."<sup>2</sup> Includes the group "Individuals."<sup>3</sup> Includes the groups "Individuals" and "All others."

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TABLE 11.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919.

POWER.	Number of engines or motors.	HORSEPOWER.		POWER.	Number of engines or motors.	HORSEPOWER.	
		Amount.	Per cent distribution.			Amount.	Per cent distribution.
Primary power, total.....	2,104	41,997	100.0	Primary power—Continued.			
Owned.....	230	23,704	56.4	Rented.....	1,874	18,293	43.6
Steam.....	139	20,247	48.2	Electric.....	1,874	18,040	43.0
Engines.....	134	17,755	42.3	Other.....		253	0.6
Turbines.....	5	2,492	5.9	Electric.....	2,630	27,338	100.0
Internal-combustion engines.....	50	862	2.1	Rented.....	1,874	18,040	66.0
Water wheels and turbines.....	41	2,595	6.2	Generated by establishments reporting.....	756	9,298	34.0

TABLE 12.—FUEL CONSUMED, BY SELECTED STATES: 1919.

STATE.	COAL.		Coke (tons, 2,000 pounds)	Fuel oils (barrels).	Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).	STATE.	COAL.		Coke (tons, 2,000 pounds)	Fuel oils (barrels).	Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).
	Anthracite (tons, 2,240 pounds)	Bituminous (tons, 2,000 pounds)						Anthracite (tons, 2,240 pounds)	Bituminous (tons, 2,000 pounds)				
United States.....	14,015	91,551	27,645	43,140	693	52,310	New Jersey.....	2,312	2,383	111	69	5,106	
Alabama.....		12					New York.....	564	283	250		1,185	
Connecticut.....	247	1,326	421	7	6		North Carolina.....		248	102		222	
Georgia.....	10	36				215	Pennsylvania.....	3,487	11,164	3,161	832	287	9,896
Maine.....	2,142	1,918	2,025	1,498			Rhode Island.....	2,305	8,816	4,235	24,092	113	5,239
Massachusetts.....	2,750	61,183	17,247	14,678	211	25,023	South Carolina.....		800		200	5	
New Hampshire.....	40	2,297		1,833		5,334	Tennessee.....		110				
							Vermont.....	10	150	50			

## SPECIAL STATISTICS.

Special statistics relating to products.—Table 13 summarizes the statistics, for 1919, relative to the different kinds or groups of textile machinery and parts and attachments for which separate totals were compiled.

TABLE 13.—TEXTILE MACHINERY AND PARTS, BY STATES: 1919.

STATE AND KIND.	Number.	Value.	STATE AND KIND.	Number.	Value.
Total value <sup>1</sup> .....		\$122,089,264	Fabric machinery—Continued.		
State totals:			New York.....		\$1,372,531
Massachusetts.....		65,901,370	New Jersey.....		98,500
Rhode Island.....		14,842,179	All other states.....		3,624,516
Pennsylvania.....		14,354,753	Machinery for converting and finishing yarn and fabrics....	22,562	7,623,707
New Hampshire.....		6,222,552	Rhode Island.....	527	2,147,293
Maine.....		6,134,677	Massachusetts.....	16,918	2,158,989
New Jersey.....		5,002,932	Pennsylvania.....	1,960	1,748,699
New York.....		2,933,308	New Jersey.....	565	855,834
Connecticut.....		2,875,689	New York.....	142	96,629
North Carolina.....		1,159,277	All other states.....	2,441	616,333
Vermont.....		722,180	Extra parts, attachments, and accessories for textile machinery.....		34,788,177
South Carolina.....		614,758	Massachusetts.....		17,378,189
All other states.....		1,325,589	Pennsylvania.....		4,334,764
Machinery for working raw stock and subsequent machinery used in textile mills in preparing yarn for weaving, knitting, etc.....	40,532	35,529,606	Rhode Island.....		3,277,523
Spinning and throwing machines—			New Jersey.....		3,086,240
Massachusetts.....	3,741	6,465,628	New Hampshire.....		2,601,169
All other states.....	3,209	3,147,805	Maine.....		959,420
Carding machines—			North Carolina.....		596,143
Massachusetts.....	13,754	7,176,675	Connecticut.....		712,974
All other states.....	1,456	440,756	South Carolina.....		565,054
Winders and warp spooling machines—			Vermont.....		456,361
Massachusetts.....	1,475	1,240,440	New York.....		219,537
All other states.....	8,215	4,562,326	All other states.....		515,788
Roving machines and slubbing frames—			Other textile machinery, including repairs.....		10,262,910
All states.....	2,359	4,509,269	Massachusetts.....		4,607,163
Twisting or doubling frames—			Pennsylvania.....		1,143,989
Massachusetts.....	770	1,618,300	New York.....		1,011,391
All other states.....	352	241,643	Rhode Island.....		832,336
Picker machines—			Connecticut.....		530,993
Massachusetts.....	817	976,366	New Jersey.....		282,388
All other states.....	118	172,299	North Carolina.....		168,017
All other preliminary machinery—			All other states.....		1,656,585
Massachusetts.....	3,286	4,012,945	Other machinery not pertaining to textiles.....		1,331,677
All other states.....	1,030	965,214	Massachusetts.....		824,176
Fabric machinery.....	(*)	29,865,051	Pennsylvania.....		185,516
Massachusetts.....		17,081,912	Rhode Island.....		177,647
Pennsylvania.....		4,494,196	All other states.....		144,338
Rhode Island.....		3,225,356	All other products, all states.....		2,687,986

<sup>1</sup> In addition, textile machinery and parts to the value of \$3,611,676 were reported by establishments engaged primarily in other industries. \* Figures not available.

## MANUFACTURES.

## GENERAL TABLE.

Detailed statement, by states.—The principal data secured by the census inquiry concerning the manufacture of textile machinery are presented in detail for

the industry as a whole and for each state for which figures can be shown in Table 14.

TABLE 14.—DETAILED STATEMENT, BY STATES: 1919.

STATE.	Number of establishments.	PERSONS ENGAGED IN THE INDUSTRY.								WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.						EXPENSES.		
		Total.	Proprietors, and firm members.	Salaried officers, superintendents, and managers.	Clerks, etc.		Wage earners.			Total.	16 and over.		Under 16.		Capital.	Salaries and wages.		
					Male.	Female.	Average number.	Number, 15th day of--			Male.	Female.	Male.	Female.		Officials.	Clerks, etc.	
								Maximum month.	Minimum month.									
United States.....	432	36,126	354	1,230	1,714	1,005	31,823	De 35,426	Ap 28,898	35,508	33,097	2,029	409	63	\$129,797,903	\$5,027,595	\$3,071,175	
Alabama.....	4	23	6	0	0	0	17	Je 21	Ja <sup>1</sup> 8	20	15	5	0	0	22,149	177,336	14,720	
Connecticut.....	23	763	44	37	5	8	669	My 703	Oc 558	697	609	78	9	1	2,771,501	27,190	3,623	
Georgia.....	9	122	6	16	1	5	94	Ja 96	Mh <sup>1</sup> 93	96	85	11	0	0	156,919	218,031	100,920	
Maine.....	10	1,871	8	59	34	38	1,732	De 1,904	Ja 1,605	1,904	1,850	54	0	0	3,914,700	2,209,299	1,545,893	
Massachusetts.....	116	10,378	71	490	861	543	17,413	Oc 10,297	Ap 15,399	19,254	17,914	1,058	252	30	76,759,604	149,910	81,551	
New Hampshire.....	11	1,194	6	27	18	34	1,109	De 1,248	Mh 1,007	1,247	1,138	108	1	0	5,131,758	282,216	113,797	
New Jersey.....	56	1,901	52	33	73	21	1,672	De 1,886	Se 1,485	1,888	1,532	291	53	12	4,532,953	256,364	94,493	
New York.....	30	872	21	56	45	44	706	De 826	Ja 630	825	788	39	0	0	2,056,641	677,157	71,858	
North Carolina.....	14	366	10	28	16	7	305	De <sup>1</sup> 318	My <sup>1</sup> 298	318	307	7	4	0	16,744,426	704,614	496,141	
Pennsylvania.....	64	4,318	60	158	291	104	3,705	De 4,387	Ja 3,276	4,369	4,252	85	28	4	15,005,963	753,605	545,236	
Rhode Island.....	60	4,575	33	228	351	187	3,776	No 4,236	Ap 3,316	4,344	4,019	252	58	15	672,254	17,555	10,325	
South Carolina.....	6	156	6	9	4	3	134	Fe 149	Jy 120	138	113	20	4	1	47,291	23,474	6,052	
Tennessee.....	4	24	2	4	0	2	16	No 19	My 12	13	13	0	0	0	483,049	70,313	17,893	
Vermont.....	14	278	19	10	3	3	243	Au 264	Ja 222	267	260	7	0	0	821,538	0	0	
All other states <sup>2</sup> .....	11	285	10	25	12	6	232			213	199	14	0	0				

STATE.	EXPENSES—continued.						Value of products.	Value added by manufacture.	POWER.						Electric horsepower generated in establishments reporting.	
	Salaries and wages—Con.		Rent and taxes.		For materials.				Primary horsepower.					Rented. <sup>4</sup>		
	Wage earners.	For contract work.	Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.			Total.	Owned.						
										Steam engines (not turbines).	Steam turbines.	Internal-combustion engines.	Water power. <sup>3</sup>			
United States.....	\$36,528,729	\$178,086	\$308,482	\$6,193,733	\$44,094,714	\$1,541,914	\$122,089,264	\$76,452,036	41,997	17,755	2,492	862	2,595	18,263	9,298	
Alabama.....	10,300	0	840	288	50,259	670	66,911	15,973	19	0	0	0	0	19	0	
Connecticut.....	668,683	0	7,422	229,355	1,062,590	21,471	2,875,689	1,791,628	819	350	0	19	155	295	25	
Georgia.....	92,552	0	1,985	8,087	180,751	2,406	377,589	188,432	78	60	0	0	0	28	0	
Maine.....	2,033,078	0	7,314	145,952	2,551,024	65,163	6,134,077	3,518,490	3,324	265	1,072	203	1,784	5	5	
Massachusetts.....	20,712,227	81,603	66,712	3,665,976	22,033,109	844,263	65,901,370	42,423,998	22,402	12,134	1,250	230	1,816	6,972	6,434	
New Hampshire.....	1,164,246	0	405	634,738	2,422,224	47,168	6,222,552	3,753,160	1,313	526	0	0	164	623	3	
New Jersey.....	1,569,500	18,264	65,268	99,270	1,760,087	70,920	5,002,932	3,171,925	1,715	591	0	224	45	855	103	
New York.....	941,879	69,074	24,939	24,117	1,042,703	32,266	2,933,308	1,858,339	754	0	0	5	8	741	0	
North Carolina.....	245,443	0	4,578	30,805	559,437	11,416	1,199,277	585,424	504	210	0	0	0	204	0	
Pennsylvania.....	4,367,609	1,864	77,602	617,273	5,551,390	199,176	14,354,753	8,604,187	4,855	2,355	0	304	0	2,196	2,358	
Rhode Island.....	4,189,640	6,956	44,952	694,840	5,457,235	217,340	14,842,179	9,167,604	4,751	840	150	35	40	3,686	275	
South Carolina.....	101,461	0	985	7,543	274,659	8,773	614,753	331,326	287	24	0	40	0	223	0	
Tennessee.....	15,296	25	720	6,818	47,920	1,873	85,112	38,310	29	0	0	0	0	29	0	
Vermont.....	185,055	0	0	19,830	250,052	7,147	722,180	455,981	780	310	20	0	164	292	50	
All other states <sup>2</sup> .....	231,694	0	4,760	25,641	236,274	11,853	792,977	544,850	361	100	0	5	0	256	45	

<sup>1</sup> Same number reported for one or more other months.

<sup>2</sup> All other states embrace: Delaware, 1 establishment; Illinois, 1; Indiana, 2; Iowa, 1; Kentucky, 2; Maryland, 1; Michigan, 1; Virginia, 1; and Wisconsin, 1.

<sup>3</sup> Includes water wheels and turbines (irrespective of ownership of water supply), and water motors (operated by water from city mains).

<sup>4</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants).

# MACHINE TOOLS.

## GENERAL STATISTICS.

**General character of the industry.**—This report presents statistics of the manufacture of machine tools in the United States in 1919. Prior to this census, separate statistics have not been shown for this industry, the figures being included with those for the foundry and machine-shop and other industries, therefore comparative figures are not available.

**Summary for 1919.**—Table 15 summarizes the statistics for the census of 1919.

**States, ranked by value of products.**—Ohio was the leading state in the manufacture of machine tools. This state, as shown in Table 16, reported 26.1 per cent of the total number of wage earners and 29.4 per cent of the total value of products. Massachusetts, second in importance, contributed 12.2 per cent and 11 per cent, respectively, of these two items. Rhode Island, third in importance, contributed 13.5 per cent and 10.5 per cent; and Connecticut, ranking fourth, contributed 10.3 per cent and 8.7 per cent, respectively, of these two items. Pennsylvania, Illinois, Michigan, Vermont, Wisconsin, New Jersey, New York, Indiana, Kentucky, Minnesota, Missouri, and Maine follow in the order listed.

**Persons engaged in the industry.**—The classification by sex for 1919 is shown separately in Table 17. The age classification of the average number of wage earners in this table is an estimate obtained by the method described in the "Explanation of terms." Figures by states will be found in Table 26.

**Wage earners, by months.**—In addition to the number of wage earners employed by months, similar data are given in Table 18 for males and females separately as well as the total average number for each state for which statistics can be presented, together with the percentage which the minimum number forms of the maximum.

**Prevailing hours of labor.**—Table 19 shows that 39.1 per cent of the employees were reported working from 48 to 54 hours per week and 31 per cent working 48 hours and less.

**Size of establishments, by average number of wage earners.**—Analysis of Table 20 discloses the significant fact that 62 establishments, or 15.4 per cent of the total number for the industry, were shown

in classes having fewer than 6 wage earners, while only 157, or about three-tenths of 1 per cent of the total number of wage earners, were employed therein, evidencing the predominance of the small establishments based upon the average number of wage earners. On the other hand, the classes "501 to 1,000" and "Over 1,000" wage earners, comprising 27 establishments, employed 27,239 wage earners, or 51.3 per cent of the total average number, illustrating the extent of manufacturing operations in a few large establishments.

**Size of establishments, by value of products.**—The statistics in Table 21 strikingly illustrate the predominance of large establishments measured by value of products. The group "\$1,000,000 and over" reports 52 establishments, or 12.9 per cent of the total number for the industry, with a value of products of \$146,142,213, or 68.8 per cent of the total value. On the other hand, the establishments in groups under \$1,000,000 report 351, or 87.1 per cent of the total number, and \$66,257,945 in value of products, or 31.2 per cent of total value.

**Character of ownership.**—Table 22 emphasizes the predominance of the corporate form of ownership. Corporations owned 79.4 per cent of the total number of establishments for the industry, employed 94.3 per cent of the total average number of wage earners, and reported 94.5 per cent of the value of products.

**Number and horsepower of types of prime movers.**—Table 23 shows primary horsepower owned and rented. Rented power predominates with a total of 70,176 horsepower, or 69.9 per cent of total horsepower.

**Fuel consumed.**—Table 24 shows the principal kinds of fuel used for the industry and also gives separately the amounts consumed in states requiring considerable quantities of fuel. Of the total for the three chief kinds of fuel used in connection with this industry, Ohio reported 31.1 per cent of the bituminous coal and 41.4 per cent of the fuel oils, and Michigan reported 30.7 per cent of the gas. Anthracite coal is naturally consumed in the Eastern states, and three states—Massachusetts, New Jersey, and Pennsylvania—combined, reported 84.4 per cent of this kind of coal used by the industry in 1919.

## MANUFACTURES.

TABLE 15.—SUMMARY: 1919.

	Number or amount.		Number or amount.
Number of establishments.....	403	Salaries and wages.....	\$84,216,825
Persons engaged.....	61,762	Salaries.....	18,037,859
Proprietors and firm members.....	132	Wages.....	66,178,969
Salaried employees.....	8,610	Paid for contract work.....	1,469,844
Wage earners (average number).....	53,111	Rent and taxes.....	18,315,255
Primary horsepower.....	100,433	Cost of materials.....	59,034,308
Capital.....	\$231,039,843	Value of products.....	212,400,153
		Value added by manufacture.....	153,365,850

<sup>1</sup> Value of products less cost of materials.

TABLE 16.—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.			STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
		Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.			Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.
United States.....	403	53,111	100	....	\$212,400	100	....	\$153,366	100	....	New Jersey.....	14	1,678	3.2	10	\$6,768	3.2	10	\$4,347	2.8	10
Ohio.....	102	13,855	26.1	1	62,554	29.4	1	45,077	29.4	1	New York.....	29	1,590	3.0	11	5,028	2.4	11	3,723	2.4	11
Massachusetts.....	46	6,471	12.2	3	23,443	11.0	2	16,534	10.8	3	Indiana.....	15	1,228	2.3	12	4,259	2.0	12	2,885	1.9	12
Rhode Island.....	13	7,169	13.5	2	22,301	10.5	3	18,607	12.1	2	Kentucky.....	7	249	0.5	14	1,022	0.5	14	708	0.5	14
Connecticut.....	33	5,472	10.3	4	18,435	8.7	4	13,512	8.8	4	Minnesota.....	5	103	0.3	15	827	0.4	15	606	0.4	15
Pennsylvania.....	82	3,671	6.9	5	16,707	7.9	5	12,029	7.8	5	Missouri.....	5	121	0.2	18	435	0.2	17	244	0.2	18
Illinois.....	28	3,273	6.2	6	15,008	7.1	6	10,253	6.7	6	Maine.....	3	5	(1)	21	16	(1)	21	10	(1)	21
Michigan.....	31	3,196	6.0	7	12,656	6.0	7	8,684	5.7	7	All other states....	10	594	1.1	....	3,820	1.8	....	2,048	1.7	....
Vermont.....	6	2,024	3.8	9	9,610	4.5	8	6,683	4.4	9											
Wisconsin.....	24	2,352	4.4	8	9,415	4.4	9	6,810	4.4	8											

<sup>1</sup> Less than one-tenth of 1 per cent.

TABLE 17.—PERSONS ENGAGED IN THE INDUSTRY: 1919.

CLASS.	Total.	Male.	Female.	PER CENT OF TOTAL.		CLASS	Total.	Male.	Female.	PER CENT OF TOTAL.	
				Male.	Female.					Male.	Female.
All classes.....	61,762	57,066	4,696	92.4	7.6	Clerks and other subordinate salaried employees.....	6,186	3,698	2,488	59.8	40.2
Proprietors and officials.....	2,465	2,425	40	98.4	1.6	Wage earners (average number).....	53,111	50,943	2,168	95.9	4.1
Proprietors and firm members.....	132	129	3	97.7	2.3	16 years of age and over.....	53,000	50,834	2,166	95.9	4.1
Salaried officers of corporations.....	637	615	22	96.5	3.5	Under 16 years of age.....	111	109	2	98.2	1.8
Superintendents and managers.....	1,696	1,631	15	99.1	0.9						

TABLE 18.—WAGE EARNERS, BY MONTHS, FOR SELECTED STATES: 1919.

[The month of maximum employment is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
United States.....	53,111	55,750	52,941	51,656	50,195	<b>49,615</b>	50,166	51,074	52,498	52,713	55,190	56,994	58,640	84.4
Males.....	50,943	52,935	50,437	49,278	47,997	<b>47,391</b>	48,122	49,092	50,532	50,701	53,187	54,979	56,602	83.7
Females.....	2,168	<b>2,812</b>	2,504	2,378	2,198	2,124	2,044	1,982	1,966	<i>1,992</i>	2,003	2,015	2,038	69.4
Connecticut.....	5,472	<b>5,928</b>	5,511	5,329	<b>5,087</b>	5,138	5,398	5,419	5,282	5,369	5,564	5,724	5,917	85.8
Illinois.....	3,273	3,385	3,366	3,336	3,156	<b>2,843</b>	<b>2,713</b>	2,971	3,212	3,380	3,537	3,636	3,751	72.3
Indiana.....	1,228	1,311	1,335	1,336	1,140	1,162	1,177	1,166	1,165	1,184	1,281	1,327	1,362	83.4
Massachusetts.....	6,471	6,915	6,626	6,497	6,258	6,032	6,045	6,868	6,131	6,315	6,704	6,974	7,297	80.2
Michigan.....	3,196	3,314	3,214	3,066	3,044	3,055	<b>3,090</b>	3,057	3,165	3,263	3,324	3,436	3,384	88.2
New Jersey.....	1,678	1,744	1,672	1,579	1,568	1,548	<b>1,591</b>	1,613	1,685	1,744	1,802	1,800	1,850	82.8
New York.....	1,590	1,607	1,480	1,384	1,433	1,467	1,615	1,602	1,658	1,638	1,652	1,768	1,888	73.4
Ohio.....	13,855	14,490	13,833	13,477	13,192	<b>12,911</b>	12,965	13,201	13,889	13,816	14,380	14,781	15,305	84.4
Pennsylvania.....	3,671	4,005	3,934	3,950	3,873	3,764	3,691	3,688	3,647	<b>3,033</b>	3,344	3,504	3,619	75.7
Rhode Island.....	7,169	7,370	<b>6,852</b>	6,444	6,543	6,716	6,984	7,194	7,138	7,354	7,828	7,999	8,092	78.5
Vermont.....	2,024	1,989	1,970	1,919	1,897	1,808	2,006	2,042	2,071	2,014	2,130	2,147	2,205	88.0
Wisconsin.....	2,352	2,505	2,485	2,408	<b>1,886</b>	1,905	2,030	2,203	2,359	2,488	2,480	<b>2,722</b>	2,703	69.3

TABLE 19.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR SELECTED STATES: 1919.

STATE.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—						STATE.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—					
		44 and under.	Between 44 and 48.	48.	Between 48 and 54.	54.	Between 54 and 60.			44 and under.	Between 44 and 48.	48.	Between 48 and 54.	54.	Between 54 and 60.
United States.....	53,111	239	1,024	15,313	20,749	5,407	10,259	New Jersey.....	1,078	.....	846	17	138	591	86
Connecticut.....	5,472	13	.....	1,091	632	2,062	1,074	New York.....	1,590	13	4	1,260	271	22	11
Illinois.....	3,273	182	5	7	1,071	78	1,330	Ohio.....	13,855	1	109	7,926	3,241	473	2,045
Indiana.....	1,223	.....	.....	25	762	56	385	Pennsylvania.....	3,071	.....	.....	1,033	974	342	1,208
Massachusetts.....	6,471	.....	.....	643	3,865	692	1,270	Rhode Island.....	7,169	.....	.....	.....	7,065	.....	104
Michigan.....	3,196	.....	.....	144	1,760	185	1,107	Vermont.....	2,024	.....	.....	1,209	63	687	.....
								Wisconsin.....	2,352	22	.....	570	147	800	807

TABLE 20.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR SELECTED STATES: 1919.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—																
	Es- tab- lish- ments.	Wage earners (average num- ber).	No wage earn- ers.	1 to 5 wage earners, inclusive.		6 to 20 wage earners, inclusive.		21 to 50 wage earners, inclusive.		51 to 100 wage earners, inclusive.		101 to 250 wage earners, inclusive.		251 to 500 wage earners, inclusive.		501 to 1,000 wage earners, inclusive.		Over 1,000 wage earners.	
			Estab- lish- ments.	Estab- lish- ments.	Wage earn- ers.	Estab- lish- ments.	Wage earn- ers.	Estab- lish- ments.	Wage earn- ers.	Estab- lish- ments.	Wage earn- ers.	Estab- lish- ments.	Wage earn- ers.	Estab- lish- ments.	Wage earn- ers.	Estab- lish- ments.	Wage earn- ers.	Estab- lish- ments.	Wage earn- ers.
United States.....	403	53,111	8	54	157	87	1,092	85	2,861	65	4,693	52	8,259	25	8,810	21	14,375	6	12,854
Connecticut.....	33	5,472	.....	0	18	8	98	10	305	2	145	2	273	2	510	1	828	2	3,255
Illinois.....	28	3,273	1	0	25	5	57	4	134	5	381	3	431	2	768	2	1,477	.....	.....
Indiana.....	15	1,228	1	2	5	1	19	5	192	3	200	1	144	2	608	.....	.....	.....	.....
Massachusetts.....	46	6,471	.....	4	0	7	103	12	442	10	721	5	850	4	1,312	3	1,744	1	1,293
Michigan.....	31	3,196	.....	3	10	7	81	4	144	8	590	7	1,005	.....	.....	2	1,366	.....	.....
New Jersey.....	14	1,678	1	2	8	6	78	1	26	2	138	.....	.....	1	416	2	1,428	.....	.....
New York.....	20	1,590	1	5	19	9	97	7	189	2	137	4	732	1	416	.....	.....	.....	.....
Ohio.....	102	13,855	2	8	22	17	230	22	798	20	1,486	19	3,204	9	3,307	3	2,625	2	2,283
Pennsylvania.....	32	3,071	.....	3	9	11	134	6	175	2	126	5	810	3	1,204	2	1,213	.....	.....
Rhode Island.....	13	7,169	.....	3	7	2	28	2	82	4	317	.....	.....	.....	.....	1	702	1	6,033
Vermont.....	0	2,024	.....	1	3	.....	.....	.....	.....	1	68	1	139	.....	.....	3	1,814	.....	.....
Wisconsin.....	24	2,352	1	3	8	4	34	8	243	3	186	2	307	1	296	2	1,278	.....	.....

TABLE 21.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919.

VALUE OF PRODUCT.	Num-ber of estab-lish-ments.	Average number of wage earners.	Value of products.	Value added by manu-facture.	VALUE OF PRODUCT.	Num-ber of estab-lish-ments.	Average number of wage earners.	Value of products.	Value added by manu-facture.
All classes.....	403	53,111	\$212,400,158	\$153,365,850	Per cent distribution.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	19	19	48,739	31,345	Less than \$5,000.....	4.7	(1)	(1)	(1)
\$5,000 to \$20,000.....	47	226	508,655	353,208	\$5,000 to \$20,000.....	11.7	0.4	0.3	0.2
\$20,000 to \$100,000.....	110	1,941	6,020,550	3,977,057	\$20,000 to \$100,000.....	27.3	3.7	2.8	2.6
\$100,000 to \$500,000.....	134	8,162	31,759,941	21,488,595	\$100,000 to \$500,000.....	33.3	15.4	15.0	14.0
\$500,000 to \$1,000,000.....	41	7,235	27,850,054	20,009,404	\$500,000 to \$1,000,000.....	10.2	13.0	13.1	13.0
\$1,000,000 and over.....	52	35,528	146,142,213	107,596,182	\$1,000,000 and over.....	12.9	68.9	68.8	70.1

1 Less than one-tenth of 1 per cent.



## MANUFACTURES.

TABLE 22.—CHARACTER OF OWNERSHIP, BY SELECTED STATES: 1919.

STATE.	NUMBER OF ESTABLISHMENTS OWNED BY—			AVERAGE NUMBER OF WAGE EARNERS.									VALUE OF PRODUCTS.								
				Total.	In establishments owned by—			Per cent of total.			Total.	Of establishments owned by—			Per cent of total.						
	Indi-vid-u-als.	Cor-pora-tions.	All oth-ers.		Indi-vid-u-als.	Cor-pora-tions.	All oth-ers.	Indi-vid-u-als.	Cor-pora-tions.	All oth-ers.		Indi-vid-u-als.	Cor-pora-tions.	All oth-ers.	Indi-vid-u-als.	Cor-pora-tions.	All oth-ers.				
United States.....	46	320	37	53,111	650	50,100	2,361	1.2	94.3	4.4	\$212,400,158	\$2,082,478	\$200,730,860	\$9,586,820	1.0	94.5	4.5				
Connecticut.....	2	31	.....	5,472	.....	15,472	.....	.....	100.0	.....	18,435,449	.....	18,435,449	.....	.....	100.0	.....				
Illinois.....	3	24	1	3,273	* 028	2,345	.....	28.4	71.6	.....	15,008,096	* 3,512,501	11,495,595	.....	23.4	76.0	.....				
Indiana.....	1	12	2	1,228	.....	1,080	* 148	.....	87.9	12.1	4,259,463	.....	3,538,946	1,720,517	.....	83.1	16.9				
Massachusetts.....	11	30	5	6,471	328	5,634	509	5.1	87.1	7.9	23,442,547	1,150,310	20,462,575	1,839,662	4.9	87.2	7.8				
Michigan.....	3	27	1	3,196	* 141	3,055	.....	4.4	95.6	.....	12,656,492	* 410,419	12,246,073	.....	3.2	96.8	.....				
New Jersey.....	2	11	1	1,678	* 14	1,664	.....	0.8	99.2	.....	6,767,671	* 61,029	6,716,642	.....	0.8	99.2	.....				
New York.....	4	22	3	1,560	29	1,510	51	1.8	95.0	3.2	5,027,880	91,504	4,812,397	123,979	1.8	95.7	2.5				
Ohio.....	7	35	10	13,855	46	13,270	539	0.3	95.8	3.9	62,554,169	178,059	60,188,897	2,187,213	0.3	95.2	3.5				
Pennsylvania.....	2	24	6	3,671	.....	3,548	* 123	.....	96.6	3.4	16,797,040	.....	16,277,662	* 519,378	.....	96.9	3.1				
Rhode Island.....	2	11	.....	7,169	.....	7,169	.....	.....	100.0	.....	22,301,290	.....	22,301,290	.....	.....	100.0	.....				
Vermont.....	.....	6	.....	2,024	.....	2,024	.....	.....	100.0	.....	9,609,745	.....	9,609,745	.....	.....	100.0	.....				
Wisconsin.....	2	20	2	2,352	.....	2,312	* 40	.....	98.3	1.7	9,414,820	.....	9,069,044	* 345,776	.....	98.3	3.7				

<sup>1</sup> Includes the group "Individuals."<sup>2</sup> Includes the group "All others."

TABLE 23.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919.

POWER.	Number of engines or motors.	HORSEPOWER.		POWER.	Number of engines or motors.	HORSEPOWER.	
		Amount.	Per cent distribution.			Amount.	Per cent distribution.
Primary power, total.....	7,971	100,433	100.0	Primary power—Continued.			
Owned.....	220	30,257	30.1	Rented.....	7,751	70,176	69.9
Steam.....	149	26,975	26.9	Electric.....	7,751	70,037	69.7
Engines.....	132	20,325	20.2	Other.....		139	0.1
Turbines.....	17	6,650	6.6	Electric.....	11,408	98,817	100.0
Internal-combustion engines.....	55	2,249	2.2	Rented.....	7,751	70,037	70.9
Water wheels and turbines.....	16	1,033	1.0	Generated by establishments reporting.....	3,657	28,780	29.1

TABLE 24.—FUEL CONSUMED, BY SELECTED STATES: 1919.

STATE.	COAL.		Coke (tons, 2,000 lbs.).	Fuel oils (barrels).	Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).	STATE.	COAL.		Coke (tons, 2,000 lbs.).	Fuel oils (barrels).	Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).
	Anthracite (tons, 2,240 lbs.).	Bituminous (tons, 2,000 lbs.).						Anthracite (tons, 2,240 lbs.).	Bituminous (tons, 2,000 lbs.).				
United States.....	17,513	196,071	28,871	55,681	9,462	335,130	New Jersey.....	1,837	10,585	1,855	1,025	52	80
Connecticut.....	644	19,768	3,267	8,191	757	9,902	New York.....	633	3,363	310	125	734	3,210
Illinois.....	14	18,043	1,621	30	28	54,249	Ohio.....	269	61,004	2,955	23,059	754	75,223
Indiana.....	6	4,917	865	867	.....	840	Pennsylvania.....	11,209	14,389	3,322	2,235	358	39,126
Massachusetts.....	1,083	17,452	1,616	7,690	145	19,119	Rhode Island.....	269	13,155	9,360	6,495	148	16,261
Michigan.....	7	9,491	.....	4,244	6,050	102,948	Vermont.....	556	2,774	.....	1,542	1,066	1,492
							Wisconsin.....	329	16,697	2,181	276	98	2,668

## SPECIAL STATISTICS.

Detailed statistics of products.—Machine tools for the establishments here considered are subdivided, as shown in Table 25, into 18 principal classes: (1) Lathes, (2) milling, (3) grinding, (4) drilling, (5) screw, (6) boring, (7) planers, (8) presses, (9)

gear-cutting, (10) hammers, (11) shapers, (12) pipe, (13) shears, (14) broaching, (15) bending, (16) portable tools, (17) all other machine tools, and (18) all other products. In 1919 the total value of such manufactures was \$212,400,158.

# MACHINE TOOLS.

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TABLE 25.—DETAILED STATISTICS OF QUANTITY AND VALUE: 1919.

STATE AND KIND.	Number.	Value.	STATE AND KIND.	Number.	Value.
Total value.....		\$212,400,158	Drilling machines—Continued.		
Ohio.....		62,554,109	Upright.....	6,477	\$1,754,463
Massachusetts.....		23,442,547	Illinois.....	3,801	801,188
Rhode Island.....		22,301,290	All other states.....	2,673	803,275
Connecticut.....		18,435,449	Screw machines:		
Pennsylvania.....		16,797,040	Automatic.....	3,181	6,465,636
Illinois.....		15,008,096	Hand.....	3,046	3,159,410
Michigan.....		12,656,492	Ohio.....	2,365	2,642,132
Vermont.....		9,609,745	All other states.....	681	517,278
Wisconsin.....		9,414,820	Boring machines:		
New Jersey.....		6,767,671	Horizontal.....	826	4,437,937
New York.....		5,027,880	Ohio.....	343	1,448,449
Indiana.....		4,259,403	Pennsylvania.....	126	1,346,532
Kentucky.....		1,022,499	Massachusetts.....	97	445,864
All other states.....		5,102,997	All other states.....	260	1,203,092
Lathes:			Vertical.....	607	4,329,654
Engine lathes.....	17,188	23,239,849	Ohio.....	248	2,410,446
Ohio.....	6,775	12,604,232	Pennsylvania.....	258	1,346,029
Pennsylvania.....	74	1,739,737	All other states.....	101	783,179
Massachusetts.....	1,411	1,670,023	Planers.....	1,482	8,128,655
New York.....	2,008	1,393,223	Ohio.....	899	4,154,315
Illinois.....	1,080	431,286	Massachusetts.....	151	584,661
Kentucky.....	647	367,894	Pennsylvania.....	20	600,987
All other states.....	5,193	5,033,454	All other states.....	442	2,788,692
Turret lathes.....	4,657	10,140,582	Presses:		
Indiana.....	861	1,470,910	Punching.....	32,168	5,400,044
Massachusetts.....	205	556,837	Ohio.....	31,457	4,530,299
All other states.....	3,591	8,112,785	All other states.....	711	869,745
Bench and other lathes.....	7,180	4,094,346	All other.....	3,618	956,855
Massachusetts.....	2,224	903,247	New Jersey.....	559	135,480
Illinois.....	1,199	781,103	Ohio.....	370	158,865
New York.....	903	444,368	Illinois.....	240	28,770
Connecticut.....	280	96,622	All other states.....	2,449	633,740
All other states.....	2,520	1,899,006	Gear-cutting machines.....	2,688	5,845,565
Milling machines:			Hammers, pneumatic and other.....	38,535	4,051,074
Plain.....	4,635	6,171,040	Ohio.....	7,348	807,977
Ohio.....	1,926	2,629,301	New York.....	363	256,220
Wisconsin.....	924	1,536,666	All other states.....	30,824	3,837,768
New York.....	646	479,937	Shapers.....	4,515	4,230,695
Connecticut.....	274	176,986	Ohio.....	1,875	1,662,301
All other states.....	865	1,348,150	Michigan.....	217	308,856
Universal.....	3,163	5,580,044	Pennsylvania.....	13	81,947
Wisconsin.....	914	1,710,317	All other states.....	2,410	2,177,591
Ohio.....	1,155	1,800,215	Pipe machines.....	4,118	2,481,441
All other states.....	1,094	2,009,512	Ohio.....	1,048	585,572
Vertical.....	1,304	2,755,943	All other states.....	3,070	1,895,869
Automatic.....	822	1,232,048	Shears.....	1,367	1,566,467
All other.....	1,556	2,787,290	Broaching machines.....	549	1,395,300
Grinding machines:			Bending machines.....	153	941,739
Plain.....	8,359	12,011,923	Portable tools.....		10,907,928
Massachusetts.....	4,425	6,234,103	Michigan.....		2,881,729
Pennsylvania.....	1,029	2,381,570	Ohio.....		2,650,146
Ohio.....	993	925,229	Pennsylvania.....		185,965
Connecticut.....	533	382,846	Connecticut.....		58,004
Wisconsin.....	150	169,484	All other states.....		5,131,484
All other states.....	1,220	1,021,691	All other machine tools.....		31,313,335
Universal.....	1,792	2,066,166	Massachusetts.....		6,346,063
Massachusetts.....	771	520,307	Ohio.....		6,232,137
Ohio.....	241	354,843	Rhode Island.....		5,109,905
All other states.....	780	1,191,016	Connecticut.....		4,340,245
All other.....	2,735	1,725,252	Michigan.....		2,523,745
Massachusetts.....	560	404,990	Pennsylvania.....		1,081,883
Connecticut.....	223	310,378	Illinois.....		1,258,778
Ohio.....	349	237,676	Wisconsin.....		1,375,280
Illinois.....	163	119,687	New Jersey.....		719,271
All other states.....	1,435	652,521	New York.....		682,710
Drilling machines:			Indiana.....		590,683
Radial.....	2,732	5,702,134	All other states.....		1,052,019
Ohio.....	2,416	4,635,136	All other products.....		32,652,832
All other states.....	316	1,066,998			
Multiple spindle.....	1,440	1,998,594			
Ohio.....	65	210,482			
All other states.....	1,375	1,788,112			
Sensitive.....	5,993	1,974,917			
Massachusetts.....	1,985	1,045,573			
All other states.....	4,008	929,344			

## GENERAL TABLE.

Detailed statement, by states.—Table 26 presents, for 1919, statistics in detail for the industry as a whole.

TABLE 26.—DETAILED STATEMENT, BY STATES: 1919.

STATE.	Number of establishments	PERSONS ENGAGED IN THE INDUSTRY.								WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.						EXPENSES.		
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks, etc.		Wage earners.			Total.	16 and over.		Under 16.		Capital.	Salaries and wages.		
					Ma.	Fe-male.	Average number.	Number, 15th day of—			Male.	Fe-male.	Male.	Fe-male.		Officials.	Clerks, etc.	
								Maximum month.	Minimum month.									
United States..	403	61,762	132	2,333	3,698	2,488	53,111	De 58,640	My 49,515	58,776	50,618	2,035	121	2	\$231,039,843	\$9,491,052	\$8,545,904	
Connecticut.....	33	6,311	2	208	360	263	5,472	Ja 5,926	Ap 5,087	5,943	5,702	181	59	1	20,880,557	926,324	669,478	
Illinois.....	28	3,841	6	145	278	139	3,273	De 3,751	Je 2,713	3,764	3,624	138	2	.....	14,323,537	650,595	646,123	
Indiana.....	15	1,464	6	114	78	38	1,228	De 1,362	Mh 1,136	1,360	1,355	3	2	.....	4,815,557	478,508	136,472	
Kentucky.....	7	292	10	10	9	8	249	De 302	Ja 209	302	297	5	.....	.....	638,454	62,892	19,729	
Maine.....	3	8	3	.....	.....	.....	5	(C)	(C)	5	5	.....	.....	.....	15,697	.....	.....	
Massachusetts.....	46	7,709	22	274	499	473	6,471	De 7,297	Jy 5,558	7,370	7,011	326	32	1	32,446,551	925,899	995,451	
Michigan.....	31	3,985	5	137	212	135	3,196	No 3,436	Je 3,030	3,385	3,177	202	6	.....	14,438,803	663,481	547,780	
Minnesota.....	5	224	3	10	25	23	163	De 198	Je 102	197	197	.....	.....	.....	778,024	25,325	32,383	
Missouri.....	5	155	.....	18	13	3	121	De 149	Je 104	149	149	.....	.....	.....	461,177	61,708	16,453	
New Jersey.....	14	2,186	4	113	255	136	1,078	De 1,850	Je 1,531	1,844	1,844	.....	.....	.....	7,343,687	349,188	586,792	
New York.....	29	1,853	12	106	96	59	1,500	De 1,886	Mh 1,384	1,881	1,871	7	3	.....	7,351,076	308,641	201,812	
Ohio.....	102	16,112	29	663	1,038	527	13,855	De 15,305	My 12,911	15,333	15,064	260	9	.....	56,626,895	2,511,242	2,028,708	
Pennsylvania.....	32	4,400	17	163	358	191	3,671	Ja 4,005	Se 3,033	3,612	3,544	65	3	.....	21,899,376	717,680	936,704	
Rhode Island.....	13	7,776	2	142	160	303	7,169	De 8,092	Fe 6,352	8,099	7,422	675	2	.....	25,036,802	536,253	661,396	
Vermont.....	6	2,313	.....	39	165	85	2,024	De 2,205	Ap 1,897	2,213	2,112	100	1	.....	11,041,881	290,747	479,871	
Wisconsin.....	24	2,760	6	158	152	92	2,352	No 2,722	Ap 1,886	2,703	2,628	73	2	.....	10,865,674	711,431	499,472	
All other states <sup>1</sup> .....	10	663	6	27	24	13	594	.....	.....	616	616	.....	.....	.....	3,111,125	182,038	88,620	

STATE.	EXPENSES—continued.							Value of products.	Value added by manufacture.	POWER.						
	Salaries and wages—Con.	For contract work.	Rent and taxes.		For materials.					Primary horsepower.						Electric horsepower generated in establishments reporting.
			Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.	Total.			Owned.				Rented. <sup>4</sup>		
										Steam engines (not turbines).	Steam turbines.	Internal-combustion engines.	Water power. <sup>3</sup>			
United States....	\$66,178,969	\$1,469,844	\$476,353	\$17,838,902	\$56,048,334	\$2,985,974	\$212,400,158	\$153,365,850	100,433	20,325	6,650	2,249	1,033	70,176	28,780	
Connecticut.....	7,247,888	8,917	13,125	1,040,390	4,548,245	374,721	18,435,449	13,512,483	8,903	1,262	200	60	110	7,271	35	
Illinois.....	4,410,243	6,093	19,046	593,090	4,582,312	173,097	15,008,096	10,252,687	5,767	1,065	.....	12	10	3,774	1,090	
Indiana.....	1,383,825	21,854	18,123	208,788	1,303,228	71,107	4,259,463	2,885,128	2,272	150	.....	.....	.....	2,112	150	
Kentucky.....	272,222	8,487	840	37,267	303,250	11,595	1,022,499	707,654	381	.....	.....	.....	.....	821	.....	
Maine.....	4,780	50	300	98	5,368	293	15,555	9,894	18	.....	.....	.....	.....	18	.....	
Massachusetts.....	7,610,041	101,642	98,717	1,072,132	6,532,701	376,062	23,442,547	16,533,784	12,676	2,165	35	.....	170	10,306	780	
Michigan.....	4,408,088	25,476	32,501	619,855	3,789,355	182,818	12,656,492	8,684,319	5,905	400	.....	320	.....	5,185	.....	
Minnesota.....	182,168	55,054	6,720	13,116	207,584	13,618	827,184	605,982	334	.....	.....	.....	.....	334	.....	
Missouri.....	148,077	140	7,764	4,044	184,076	6,009	434,999	244,315	211	.....	.....	.....	.....	211	.....	
New Jersey.....	1,519,552	4,309	3,742	936,220	2,345,341	75,241	6,767,671	4,347,089	3,984	1,365	2,200	25	.....	394	4,122	
New York.....	1,825,120	20,665	109,596	306,056	1,231,764	73,181	5,027,880	3,722,935	3,925	300	.....	24	20	3,581	10	
Ohio.....	17,071,020	406,294	119,528	6,294,723	16,731,367	745,468	62,554,109	45,077,334	25,255	4,649	1,635	915	.....	18,055	9,309	
Pennsylvania.....	5,141,121	492,633	24,257	1,967,759	4,516,253	261,782	16,797,040	12,029,005	8,530	3,619	.....	802	.....	4,115	7,840	
Rhode Island.....	8,702,410	17,243	5,284	1,723,094	3,368,170	325,796	22,301,290	18,607,324	8,998	550	1,530	.....	.....	6,918	.....	
Vermont.....	2,550,347	5,590	2,400	1,434,642	2,817,119	110,016	9,009,745	6,682,610	7,201	300	1,050	.....	450	5,401	.....	
Wisconsin.....	2,836,033	182,924	12,255	1,044,683	2,459,188	142,270	9,414,826	6,816,392	4,325	2,950	.....	21	267	1,087	4,386	
All other states <sup>1</sup> .....	864,828	111,873	2,185	544,045	1,128,014	52,300	3,825,259	2,646,945	1,742	650	.....	.....	.....	1,092	458	

<sup>1</sup> Same number reported throughout the year.<sup>2</sup> All other states embrace: California, 2 establishments; Delaware, 1; Iowa, 1; Kansas, 1; Maryland, 1; New Hampshire, 3; Washington, 1.<sup>3</sup> Includes water wheels and turbines (irrespective of ownership of water supply), and water motors (operated by water from city mains).<sup>4</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants).

# ENGINES, STEAM, GAS, AND WATER.

## GENERAL STATISTICS.

**General character of the industry.**—The engines manufactured by establishments here considered may be subdivided into four classes: (1) Steam engines, (2) internal-combustion engines, (3) traction engines, not locomotive, and (4) water wheels, motors, turbines, etc. In many establishments, however, minor or subsidiary products are manufactured which can not properly be assigned to any of these groups, the value of which is necessarily included in the total value of the products of the factory reporting. In 1919 the total value of these subsidiary or minor products was \$126,910,209, such products including engine parts, automobiles and trailers, agricultural implements, electrical machinery, general machinery, pumps, condensers, and other miscellaneous items.

Engines were also made by establishments engaged primarily in the manufacture of other products to the value of \$115,259,101 in 1919, and \$39,421,230 in 1914.

**Importance and growth of the industry.**—Table 1 summarizes the statistics for 1919 and 1914; prior to 1914 separate statistics were not obtained for this industry. With the exception of the number of establishments, and proprietors and firm members, a large increase is shown in every item. The increases, however, in salaries and wages, cost of materials, and value of products are due largely to a general rise of prices and wages following the World War, and do not, therefore, fairly measure the growth of the industry for the period. A truer index of the conditions is found in the increase in the average number of wage earners and primary horsepower. The addition of the Federal income tax since 1914 will account for the increase in "Rent and taxes." "Contract work," or work performed by employees other than those in the plant reporting, has little significance, since it represents merely the methods of manufacture used by establishments, which vary from year to year.

**Principal states, ranked by value of products.**—Michigan, as shown by Table 2, was in 1919 the leading state in the manufacture of engines. This state reported 18.4 per cent of the total number of wage earners, and 21.9 per cent of the total value of products. Wisconsin, second in importance, contributed 22.9 per cent and 19.6 per cent, respectively, of these two items. Although engines were manufactured in 33 different states, the industry has become centralized in Michigan, Wisconsin, Pennsylvania, Illinois, Ohio, and New York, named in the order of their rank by value of products. Combined, the 6 states produced 78.2 per cent of the total

value of products for the industry in 1919, and employed 78.7 per cent of the total number of wage earners.

**Persons engaged in the industry.**—The classification, by sex, for 1919 was reported separately, but for 1914 was obtained in the same manner as the distribution by age. The age classification of the average number of wage earners in Table 3 is an estimate obtained by the method described in the "Explanation of terms." Figures in detail will be found in Table 16.

**Wage earners, by months.**—The statistics for wage earners in Table 4 show the regularity of employment, or the reverse, in accordance with the existing industrial conditions during the census years reported. In 1919 the number employed in the industry month by month ranged from a maximum of 90,102 in January to a minimum of 70,193 in May, the minimum number being equivalent to 77.9 per cent of the maximum. This table presents the number of males and females separately for the United States for 1919, and combined figures for the United States for 1914 and for the principal states for 1919.

**Prevailing hours of labor.**—Table 5 shows a marked shortening of the working day for the industry since 1914. In that year only 10.3 per cent were reported as employed fewer than 54 hours per week, as against 67.3 per cent in 1919. In 1914 the "60" and "Over 60" groups constituted 9.9 per cent of the total wage earners, as compared with 2.3 per cent in 1919.

**Size of establishments, by average number of wage earners.**—Analysis of Table 6 discloses the significant fact that 66 establishments, or 17.8 per cent of the total number for the industry, employed less than 6 wage earners each, while only 185, or one-fifth of 1 per cent of the total number of wage earners, were employed therein, evidencing the predominance of the small establishments based upon the average number of wage earners. On the other hand, the classes "501 to 1,000" and "Over 1,000" wage earners, comprising 39 establishments, employed 53,064 wage earners, or 68.4 per cent of the total average number, illustrating the extent of manufacturing operations in a few large establishments.

**Size of establishments, by value of products.**—At the census of 1914 establishments with products valued at "\$100,000 to \$1,000,000" constituted one group, but at the census of 1919 this group was subdivided into "\$100,000 to \$500,000," and "\$500,000 to \$1,000,000." Separate figures for the number of establishments and value of products have been compiled, however, from the returns for 1914. Table 7,

therefore, gives combined figures for these two groups in the case of average number of wage earners and value added by manufacture, in 1914. The statistics in the table show the degree of concentration of production in large establishments. In 1919 the groups "\$500,000 to \$1,000,000" and "\$1,000,000 and over" included 123 establishments, or 33.2 per cent of the total number for the industry; employed 70,374 wage earners, or 90.6 per cent of the total average number; and reported products to the value of \$434,346,867, or 93.4 per cent of the total value of products.

**Character of ownership.**—Table 8 emphasizes the predominance of the corporate form of ownership. Corporations owned 82.7 per cent of the total number of establishments for the industry in 1919; employed 98.8 per cent of the total average number of wage earners; and reported 99 per cent of the total

value of products. During the five-year period 1914 to 1919 the average number of wage earners employed by corporations increased by 48,952, or 176.4 per cent, and the value of products by \$392,561,748, or 579.2 per cent.

**Number and horsepower of types of prime movers.**—From 1914 to 1919, as shown by Table 9, there was an increase in the total horsepower for the industry of 126,974 horsepower, or 201.4 per cent. Owned power showed an increase of 46,784 horsepower, or 117.2 per cent, and rented power increased 80,190 horsepower, or 346.5 per cent.

**Fuel consumed.**—Table 10 shows the principal kinds of fuel used for the industry in 1919 and 1914, and also gives separately the amounts consumed in states requiring considerable quantities of fuel for manufacturing purposes.

TABLE 1.—COMPARATIVE SUMMARY: 1919 AND 1914.

	1919	1914	Per cent of increase, <sup>1</sup> 1914-1919.		1919	1914	Per cent of increase, <sup>1</sup> 1914-1919.
Number of establishments.....	370	448	-17.0	Salaries and wages.....	\$136,347,404	\$28,586,083	377.0
Persons engaged.....	96,286	36,303	165.2	Salaries.....	30,012,039	7,165,345	331.4
Proprietors and firm members...	93	197	-52.8	Wages.....	105,435,455	21,420,737	392.2
Salaried employees.....	18,576	6,449	188.0	Paid for contract work.....	936,389	145,921	541.7
Wage earners (average number)...	77,617	29,657	161.7	Rent and taxes.....	21,599,073	969,916	2,120.9
Primary horsepower.....	190,021	63,047	201.4	Cost of materials.....	217,550,771	31,460,227	591.5
Capital.....	\$454,124,733	\$131,080,145	246.4	Value of products.....	464,774,735	72,121,112	544.4
				Value added by manufacture <sup>2</sup> .....	247,223,964	40,660,885	508.0

<sup>1</sup> A minus sign (—) denotes decrease.<sup>2</sup> Value of products less cost of materials.

TABLE 2.—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.			STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
		Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.			Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.
United States..	370	77,617	100.0	...	\$464,775	100.0	...	\$247,224	100.0	...	Iowa.....	17	2,739	3.5	8	\$17,611	3.8	8	\$8,716	3.5	8
Michigan.....	35	14,258	18.4	2	101,989	21.9	1	44,639	18.2	2	Indiana.....	16	2,853	3.7	7	14,473	3.1	9	6,784	2.7	11
Wisconsin.....	36	17,782	22.9	1	90,953	19.6	2	46,886	18.6	3	Minnesota.....	14	1,529	2.0	12	12,946	2.8	10	7,041	2.8	9
Pennsylvania.....	34	9,711	12.5	3	52,574	11.3	3	33,738	13.6	1	California.....	22	2,231	2.9	10	12,687	2.7	11	8,896	3.4	7
Illinois.....	25	8,645	11.1	4	45,741	9.8	4	22,097	8.9	5	Connecticut.....	16	1,764	2.3	11	7,309	1.6	12	7,041	2.8	10
Ohio.....	44	8,218	8.0	5	42,851	9.2	5	22,507	9.1	4	Missouri.....	10	782	1.0	13	4,166	0.9	13	4,015	1.6	12
New York.....	31	4,528	5.8	6	26,822	6.4	6	19,720	8.0	6	Washington.....	13	546	0.7	14	2,527	0.5	15	2,665	1.1	13
New Jersey.....	15	2,392	3.1	9	16,387	4.2	7	13,971	5.7	7	All other states...	42	1,639	2.1	...	9,739	2.1	...	5,377	2.2	...

TABLE 3.—PERSONS ENGAGED IN THE INDUSTRY: 1919 AND 1914.

CLASS.	Cen-sus year.	Total.	Male.	Fe-male.	PER CENT OF TOTAL.		CLASS.	Cen-sus year.	Total.	Male.	Fe-male.	PER CENT OF TOTAL.	
					Male.	Fe-male.						Male.	Fe-male.
All classes.....	1919	96,286	90,210	6,076	93.7	6.3	Clerks and other subordinate salaried employees.	1919	14,784	10,593	4,191	71.7	28.3
	1914	36,303	34,144	2,159	94.1	5.9		1914	5,240	3,149	2,091	60.1	39.9
Proprietors and officials.....	1919	3,885	3,844	41	98.9	1.1	Wage earners (average number).....	1919	77,617	75,773	1,844	97.6	2.4
	1914	1,406	1,401	5	99.6	0.4		1914	29,657	29,594	63	99.8	0.2
Proprietors and firm members.....	1919	93	80	7	92.5	7.5	16 years of age and over.....	1919	77,509	75,674	1,835	97.6	2.4
	1914	197	196	1	99.5	0.5		1914	29,622	29,559	63	99.8	0.2
Salaried officers of corporations.....	1919	599	591	8	98.7	1.3	Under 16 years of age.....	1919	108	99	9	91.7	8.3
	1914	478	475	3	99.4	0.6		1914	35	35	.....	100.0	.....
Superintendents and managers.....	1919	3,193	3,167	26	99.2	0.8							
	1914	731	730	1	99.9	0.1							

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TABLE 4.—WAGE EARNERS, BY MONTHS, FOR SELECTED STATES: 1919.

[The month of maximum employment for each state is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
United States:														
1919.....	77,617	90,102	85,232	83,076	74,983	<b>70,193</b>	70,452	72,749	73,265	74,811	76,852	78,240	81,449	77.9
Males.....	75,773	87,177	83,151	81,164	73,293	<b>68,563</b>	68,833	71,175	71,760	73,190	75,092	76,418	79,460	78.6
Females.....	1,844	2,925	2,081	1,912	1,690	<b>1,630</b>	1,619	1,574	<b>1,505</b>	1,621	1,760	1,822	1,989	51.5
1914.....	29,657	30,183	30,885	31,343	32,033	<b>31,643</b>	30,886	30,114	30,010	28,024	26,946	<i>26,669</i>	27,148	83.3
California.....	2,231	2,715	2,150	1,607	2,424	2,366	2,418	2,437	2,613	2,624	<b>1,691</b>	1,784	1,853	62.3
Connecticut.....	1,764	2,136	2,118	1,927	1,838	1,780	1,729	1,652	1,654	1,600	<b>1,547</b>	1,604	1,574	72.4
Illinois.....	8,645	9,821	9,583	9,325	8,455	8,382	7,955	<b>7,785</b>	8,061	8,519	8,518	8,497	8,839	79.3
Indiana.....	2,853	3,268	3,009	2,997	2,767	2,648	2,711	<b>2,530</b>	2,704	2,890	2,937	2,826	2,979	77.4
Iowa.....	2,739	3,063	3,390	3,536	3,165	3,030	3,006	3,003	<b>1,489</b>	1,619	2,116	2,485	2,006	42.1
Michigan.....	14,258	16,691	13,638	13,755	<b>10,490</b>	10,782	13,216	14,413	15,213	15,305	15,531	15,746	16,346	62.7
Minnesota.....	1,529	1,750	1,834	1,893	1,709	1,567	1,454	1,489	1,420	1,380	1,378	1,320	<b>1,154</b>	61.0
Missouri.....	782	693	676	671	704	784	780	778	815	826	835	913	909	73.5
New Jersey.....	2,392	5,057	5,054	4,438	2,959	1,016	1,543	1,457	1,360	1,293	1,288	<b>1,287</b>	1,346	25.4
New York.....	4,528	6,338	6,819	6,533	5,490	4,504	3,572	3,042	3,434	3,450	3,450	3,532	3,780	49.5
Ohio.....	6,218	6,351	6,041	6,175	5,969	<b>5,673</b>	5,988	6,029	6,067	6,231	6,202	6,213	6,477	85.1
Pennsylvania.....	9,711	10,551	10,190	9,825	9,412	<b>8,989</b>	9,323	9,399	9,237	9,265	9,630	10,140	10,571	85.0
Washington.....	546	508	233	435	530	630	680	712	661	662	563	480	302	32.7
Wisconsin.....	17,782	19,386	18,711	18,148	17,434	15,820	<b>14,626</b>	15,256	16,349	17,586	19,581	19,794	20,693	70.7

TABLE 5.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR SELECTED STATES: 1919 AND 1914.

STATE.	Census year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—							
			44 and under.	Between 44 and 48.	48. <sup>1</sup>	Between 48 and 54.	54.	Between 54 and 60.	60.	Over 60.
United States.....	1919	77,617	9,289	4,610	22,899	15,410	6,662	16,949	1,786	3
	1914	29,657	( <sup>2</sup> )	( <sup>2</sup> )	1,982	1,075	8,862	14,789	2,917	32
California.....	1919	2,231	1,271	.....	839	9	112	.....	.....	.....
	1914	813	( <sup>2</sup> )	( <sup>2</sup> )	663	.....	150	.....	.....	.....
Connecticut.....	1919	1,764	930	.....	375	262	197	.....	.....	.....
	1914	1,075	( <sup>2</sup> )	( <sup>2</sup> )	369	191	196	319	.....	.....
Illinois.....	1919	8,645	.....	.....	2,870	3,323	1,372	918	159	3
	1914	1,890	.....	.....	.....	70	515	1,190	85	.....
Indiana.....	1919	2,853	1,170	.....	.....	308	8	1,335	32	.....
	1914	1,311	( <sup>2</sup> )	( <sup>2</sup> )	69	207	210	608	217	.....
Iowa.....	1919	2,739	.....	4	584	.....	1,005	383	703	.....
	1914	1,197	( <sup>2</sup> )	( <sup>2</sup> )	456	.....	602	59	80	.....
Michigan.....	1919	14,258	390	.....	3,208	4,013	917	5,716	14	.....
	1914	4,427	.....	.....	.....	97	1,547	2,267	516	.....
Minnesota.....	1919	1,529	.....	32	763	81	86	418	149	.....
	1914	508	.....	.....	.....	20	96	196	106	.....
Missouri.....	1919	782	320	75	19	.....	12	356	.....	.....
	1914	307	.....	.....	.....	14	126	187	.....	.....
New Jersey.....	1919	2,392	881	135	123	521	43	689	.....	.....
	1914	677	( <sup>2</sup> )	( <sup>2</sup> )	2	.....	589	83	3	.....
New York.....	1919	4,528	1,801	.....	735	1,686	39	238	29	.....
	1914	1,973	( <sup>2</sup> )	( <sup>2</sup> )	5	23	1,076	604	265	.....
Ohio.....	1919	6,218	633	308	1,207	327	110	3,582	51	.....
	1914	2,962	( <sup>2</sup> )	( <sup>2</sup> )	100	179	59	2,400	224	.....
Pennsylvania.....	1919	9,711	203	.....	7,055	1,160	354	693	256	.....
	1914	5,222	( <sup>2</sup> )	( <sup>2</sup> )	213	217	2,562	1,410	788	32
Washington.....	1919	546	527	.....	19	.....	.....	.....	.....	.....
	1914	21	( <sup>2</sup> )	( <sup>2</sup> )	4	10	5	.....	2	.....
Wisconsin.....	1919	17,782	924	4,065	4,821	3,472	2,005	2,454	41	.....
	1914	6,010	( <sup>2</sup> )	( <sup>2</sup> )	91	4	216	5,400	299	.....

<sup>1</sup>Includes 48 and under for 1914.

<sup>2</sup>Corresponding figures not available.

## MANUFACTURES.

TABLE 6.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR SELECTED STATES: 1919.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—																
	Establishments.	Wage earners (average number).	No wage earners.	1 to 5 wage earners, inclusive.		6 to 20 wage earners, inclusive.		21 to 50 wage earners, inclusive.		51 to 100 wage earners, inclusive.		101 to 250 wage earners, inclusive.		251 to 500 wage earners, inclusive.		501 to 1,000 wage earners, inclusive.		Over 1,000 wage earners.	
				Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.
United States.....1919..	370	77,617	4	62	185	74	879	55	1,828	50	3,617	64	10,212	22	7,832	23	16,990	16	36,074
.....1914..	440	20,657	23	120	340	107	1,350	79	2,853	48	3,492	40	7,648	12	4,299	4	2,815	4	6,860
California.....	22	2,231	.....	6	10	4	51	3	114	1	66	6	863	1	426	1	701	.....	.....
Connecticut.....	16	1,764	.....	3	6	1	12	5	146	2	130	4	572	.....	.....	1	898	.....	.....
Illinois.....	25	8,645	.....	3	9	4	47	4	154	4	233	4	617	.....	.....	2	1,624	4	6,061
Indiana.....	16	2,853	.....	2	6	5	75	.....	.....	4	301	2	378	1	321	1	604	1	1,170
Iowa.....	17	2,730	.....	4	13	4	38	2	53	1	63	3	496	1	366	2	1,710	.....	.....
Michigan.....	35	14,258	1	5	18	3	46	6	215	6	483	7	1,315	2	854	1	700	4	10,627
Minnesota.....	14	1,529	.....	2	8	2	27	4	140	3	241	1	138	1	273	1	702	.....	.....
Missouri.....	10	782	.....	2	9	3	35	.....	.....	2	141	2	277	1	320	.....	.....	.....	.....
New Jersey.....	15	2,392	1	2	5	2	28	3	104	2	160	2	238	1	278	2	1,570	.....	.....
New York.....	31	4,528	1	3	15	10	108	3	98	1	74	9	1,659	1	461	3	2,113	.....	.....
Ohio.....	44	6,218	.....	9	27	6	59	7	215	8	553	5	742	5	1,560	3	1,866	1	1,196
Pennsylvania.....	34	9,711	.....	5	16	6	66	5	176	5	357	5	773	4	1,439	1	645	3	6,239
Washington.....	13	546	1	2	6	4	62	1	36	4	314	1	128	.....	.....	.....	.....	3	10,781
Wisconsin.....	36	17,782	.....	2	6	6	61	6	197	4	261	6	985	4	1,534	5	3,957	3	.....

TABLE 7.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919 AND 1914.

VALUE OF PRODUCT.	NUMBER OF ESTABLISHMENTS.		AVERAGE NUMBER OF WAGE EARNERS.		VALUE OF PRODUCTS.		VALUE ADDED BY MANUFACTURE.	
	1919	1914	1919	1914	1919	1914	1919	1914
All classes.....	370	446	77,617	20,657	\$464,774,735	\$72,121,112	\$247,223,964	\$40,660,885
Less than \$5,000.....	22	71	21	89	58,542	183,305	38,237	121,335
\$5,000 to \$20,000.....	37	101	157	590	400,083	1,148,389	250,204	681,350
\$20,000 to \$100,000.....	88	135	1,277	3,033	4,408,157	6,888,195	2,447,079	3,875,498
\$100,000 to \$500,000.....	100	109	5,788	14,751	25,441,080	25,236,840	13,237,168	21,185,717
\$500,000 to \$1,000,000.....	46	18	6,776	.....	33,155,061	11,836,296	18,519,049	.....
\$1,000,000 and over.....	77	12	63,598	11,164	401,191,800	26,828,084	212,723,227	14,796,985
PER CENT DISTRIBUTION.								
All classes.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than \$5,000.....	5.9	15.9	(1)	0.3	(1)	0.3	(1)	0.3
\$5,000 to \$20,000.....	10.0	22.6	0.2	2.0	0.1	0.2	0.1	1.7
\$20,000 to \$100,000.....	23.8	30.3	1.6	10.3	1.0	9.7	1.0	9.5
\$100,000 to \$500,000.....	27.0	24.4	7.5	49.7	5.5	35.5	5.4	52.1
\$500,000 to \$1,000,000.....	12.4	4.0	8.7	.....	7.1	16.6	7.5	.....
\$1,000,000 and over.....	20.8	2.7	81.9	37.6	86.3	37.7	86.0	36.4

<sup>1</sup> Less than one-tenth of 1 per cent.

TABLE 8.—CHARACTER OF OWNERSHIP, BY SELECTED STATES: 1919 AND 1914.

STATE.	Cen- sus year.	NUMBER OF ESTABLISHMENTS OWNED BY—			AVERAGE NUMBER OF WAGE EARNERS.									VALUE OF PRODUCTS.								
		Indi- vid- uals.	Cor- pora- tions.	All oth- ers.	Total.	In establishments owned by—			Per cent of total.			Total.	Of establishments owned by—			Per cent of total.						
						Indi- vid- uals.	Cor- pora- tions.	All oth- ers.	Indi- vid- uals.	Cor- pora- tions.	All oth- ers.		Indi- vid- uals.	Corpora- tions.	All others.	Indi- vid- uals.	Corpora- tions.	All oth- ers.				
United States.....	1919	47	306	17	77,617	665	76,093	259	0.9	98.8	0.3	\$464,774,735	\$3,262,902	\$460,334,108	\$1,177,725	0.7	99.0	0.3				
	1914	94	305	47	29,657	914	27,741	1,002	3.1	98.5	3.4	72,121,112	2,061,126	67,772,360	2,287,628	2.9	94.0	3.2				
California.....	1919	5	15	2	2,231	126	2,205	.....	1.2	98.8	.....	12,687,250	1,172,515	12,514,735	.....	1.4	98.6	.....				
	1914	3	20	1	813	113	800	.....	1.6	98.4	.....	2,709,907	143,251	2,666,656	.....	1.6	98.4	.....				
Connecticut.....	1919	2	12	2	1,764	181	1,683	.....	4.6	95.4	.....	7,309,474	1,486,066	6,822,508	.....	6.7	93.3	.....				
	1914	4	13	1	1,075	1217	858	.....	20.2	79.8	.....	2,551,767	1,583,062	1,968,705	.....	22.8	77.1	.....				
Illinois.....	1919	2	22	1	8,645	.....	8,583	262	.....	99.3	0.7	45,741,267	.....	45,572,299	168,968	.....	99.6	0.4				
	1914	3	22	5	1,860	7	1,774	79	0.4	95.4	4.2	3,948,730	9,552	3,799,726	130,452	0.2	96.2	3.5				
Indiana.....	1919	3	12	1	2,853	133	2,820	.....	1.2	98.8	.....	14,472,788	168,728	14,404,060	.....	0.5	99.5	.....				
	1914	5	14	2	1,311	144	1,267	.....	3.4	96.6	.....	2,808,386	164,874	2,743,512	.....	2.3	97.7	.....				

<sup>1</sup> Includes the group "All others."<sup>2</sup> Includes the group "Individuals."

# ENGINES, STEAM, GAS, AND WATER.

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TABLE 8.—CHARACTER OF OWNERSHIP, BY SELECTED STATES: 1919 AND 1914—Continued.

STATE.	Cen- sus year.	NUMBER OF ESTABLISHMENTS OWNED BY—			AVERAGE NUMBER OF WAGE EARNERS.									VALUE OF PRODUCTS.								
					In establishments owned by—			Per cent of total.						Of establishments owned by—			Per cent of total.					
		Indi- vid- uals.	Cor- pora- tions.	All oth- ers.	Total.	Indi- vid- uals.	Cor- pora- tions.	All oth- ers.	Indi- vid- uals.	Cor- pora- tions.	All oth- ers.	Total.	Individ- uals.	Corpora- tions.	All others.	Indi- vid- uals.	Corpora- tions.	All oth- ers.				
Iowa.....	1919	2	15	3	2,739	9	1,739	57	0.8	100.0	4.8	\$17,610,778	\$22,892	\$17,610,778	\$126,577	0.6	100.0	3.5				
	1914	5	12	3	1,197	9	1,131	57	0.8	94.5	4.8	3,585,946		3,430,477		0.6	95.8					
Michigan.....	1919	2	32	1	14,258	35	14,251	17	0.8	100.0	(*)	101,989,440		101,958,580	130,860	0.6	100.0	(*)				
	1914	10	35	3	4,427	35	4,261	131	0.8	90.2	3.0	12,369,172	74,470	12,074,084	220,618	0.6	97.9	1.				
Minnesota.....	1919	1	13	1	1,529	22	1,529	486	4.3	100.0		12,946,297		12,946,297		2.0	100.0					
	1914	2	14	1	508	22	486		4.3	95.7		1,950,239	\$38,417	1,911,822		2.0	98.0					
Missouri.....	1919	2	8		782		782			100.0		4,166,336		4,166,336			100.0					
	1914		6		307		307			100.0		1,171,929		1,171,929			100.0					
New Jersey.....	1919	4	11		2,392	74	2,318		3.1	96.9		19,387,212		383,024	19,004,188	2.0	98.0					
	1914	5	8	1	677	119	558		17.6	82.4		1,756,278	\$297,770	1,458,508		17.0	83.0					
New York.....	1919	3	27	1	4,528	21	4,507		0.5	99.5		29,822,286	\$83,418	29,738,868		0.3	99.7					
	1914	10	31	7	1,073	152	1,775	46	7.7	90.0	2.3	4,598,902	333,494	4,173,697	91,811	7.3	90.7	2.0				
Ohio.....	1919	6	37	1	6,218	347	5,871		5.6	94.4		42,850,677	\$1,998,551	40,852,126		4.7	95.3					
	1914	8	35	4	2,962	168	2,688	106	5.7	90.7	3.6	6,861,351	413,948	6,052,461	894,942	6.0	88.2	5.8				
Pennsylvania.....	1919	3	28	3	9,711	10	9,602	39	0.1	99.5	0.4	52,574,026	52,050	52,407,206	114,770	0.1	99.7	0.2				
	1914	13	37	6	5,222	139	5,063	20	2.7	97.0	0.4	11,391,872	243,205	11,119,227	29,440	2.1	97.6	0.3				
Washington.....	1919	3	9	1	546	33	513		6.0	94.0		2,527,275	\$127,473	2,399,802		5.0	95.0					
	1914	4	1	3	21	5		16	23.8		76.2	84,991	38,805		46,126	45.7		54.3				
Wisconsin.....	1919	1	34	1	17,782		17,782			100.0		90,953,496		\$90,953,496			100.0					
	1914	7	20	4	6,010	12	5,575	423	0.2	92.8	7.0	13,063,336	24,860	12,157,884	880,592	0.3	93.1	6.7				

<sup>1</sup> Includes the group "Individuals."  
<sup>2</sup> Less than one-tenth of 1 per cent.

<sup>3</sup> Includes the group "All others."  
<sup>4</sup> Includes the group "Corporations."

<sup>5</sup> Includes the groups "Individuals" and "All others."

TABLE 9.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919 AND 1914.

POWER.	NUMBER OF EN- GINES OR MOTORS.		HORSEPOWER.						POWER.	NUMBER OF EN- GINES OR MOTORS.		HORSEPOWER.						
			Amount.		Per cent distribu- tion.							Amount.		Per cent distribu- tion.				
	1919	1914	1919	1914	1919	1914	1919	1914		1919	1914	1919	1914					
Primary power, total.....	10,477	2,495	190,021	63,047	100.0	100.0	Primary power—Continued.						10,008	1,979	103,331	23,141	54.4	36.7
Owned.....	409	516	86,690	39,906	45.6	63.3	Rented.....						10,008	1,979	103,315	22,200	54.3	35.2
Steam.....	247	183	70,582	25,383	37.1	40.3	Electric.....						.....	.....	16	941	0.1	1.5
Engines.....	193	(1)	42,737	(1)	22.5	.....	Other.....						.....	.....	.....	.....	.....	.....
Turbines.....	49	(1)	27,845	(1)	14.6	.....	Electric.....						17,496	4,472	213,727	58,780	100.0	100.2
Internal-combustion engines.....	216	316	15,773	13,835	8.3	21.9	Rented.....						10,008	1,979	103,315	22,200	48.3	37.0
Water wheels, turbines, and motors..	6	17	335	688	0.2	1.1	Generated by establishments reporting...						7,488	2,493	110,412	36,580	51.7	62.8

<sup>1</sup> Not reported separately.

TABLE 10.—FUEL CONSUMED, BY SELECTED STATES: 1919.

STATE.	COAL.		Coke (tons, 2,000 lbs.).	Fuel oils (barrels).	Gasoline and other volatile oils (bar- rels).	Gas (1,000 cubic feet).	STATE.	COAL.		Coke (tons, 2,000 lbs.).	Fuel oils (barrels).	Gasoline and other volatile oils (bar- rels).	Gas (1,000 cubic feet).
	Anthra- cite (tons, 2,240 lbs.).	Bitu- minous (tons, 2,000 lbs.).						Anthra- cite (tons, 2,240 lbs.).	Bitu- minous (tons, 2,000 lbs.).				
United States..1919..	6,399	658,919	94,940	264,655	65,100	807,064	Minnesota.....	102	6,690	1,639	1,572	2,284	1,475
1914..	28,547	239,359	42,341	63,796	(1)	2,022,742	Missouri.....	—	2,074	1,380	7,683	605	6,350
California.....	—	38	485	24,770	741	2,230	New Jersey.....	1,252	18,707	321	2,015	1,197	8,829
Connecticut.....	377	5,292	1,050	7,747	199	244	New York.....	1,270	23,871	5,425	13,827	1,445	17,006
Illinois.....	66	66,740	11,388	33,035	12,111	143,515	Ohio.....	339	34,407	6,778	3,498	2,725	282,852
Indiana.....	—	9,493	1,365	11,619	1,736	11,367	Pennsylvania.....	2,427	211,736	6,834	3,740	1,646	186,202
Iowa.....	—	15,098	7,630	12,396	3,861	2,960	Washington.....	50	346	230	2,805	13	8,672
Michigan.....	208	74,910	10,625	52,752	15,475	40,788	Wisconsin.....	98	183,169	38,215	86,791	19,131	83,861

<sup>1</sup> Included in figures for fuel oils.



## MANUFACTURES.

## SPECIAL STATISTICS.

Certain additional detailed information concerning the quantity and value of products for the industry is collected by means of supplemental schedules. In the foregoing tables statistics are presented for only those establishments engaged primarily in the manufacture of engines. There is, however, a considerable production of engines by establishments engaged primarily in other lines of manufacture. The general statistics for these subsidiary products are included with the statistics of the industry reporting them. In order to present in detail the number, type, and horsepower of the engines built in these establishments, the data in the following tables of production include the subsidiary engine products of establishments classed under other industries.

Classes of engines, grouped according to horsepower capacity.—Table 11 shows in comparative form for 1919 and 1914 the various types of engines manufactured, divided into horsepower groupings. Of the total value of products in 1919, \$453,123,627, or 78.1 per cent, was the value of completed engines. Of the total number of engines built, 37.4 per cent were stationary and portable internal-combustion engines, 26.7 per cent automobile engines, and 25.7 per cent traction engines. That there was a tendency to build larger units is shown by the fact that in 1914 the average horsepower per engine was slightly less than 16, but in 1919 the average rose to nearly 29 horsepower per engine.

TABLE 11.—NUMBER OF EACH CLASS OF ENGINES, GROUPED ACCORDING TO INDICATED HORSEPOWER CAPACITY, AND TOTAL HORSEPOWER AND VALUE: 1919 AND 1914.

CLASS.	Cen- sus year.	Total number of engines.	NUMBER, BY INDICATED HORSEPOWER CAPACITY.										Total indicated horsepower rating.	Value.
			Under 10.	10 to 49.	50 to 99.	100 to 499.	500 to 999.	1,000 to 1,999.	2,000 to 4,999.	5,000 to 9,999.	10,000 and over.			
Products: Aggregate.....	1919 1914	836,206 418,526	324,456 293,259	488,340 111,150	9,439 10,877	11,034 2,576	503 359	1,786 95	331 104	158 39	159 61	23,948,454 6,553,956	\$580,033,836 111,542,342	
Manufactured by establishments engaged primarily in the engine industry.	1919 1914	742,566 346,894	290,204 253,610	435,399 83,513	8,294 7,220	6,034 1,724	436 200	1,692 51	260 40	88 16	99 20	19,340,501 4,258,297	464,774,735 72,121,112	
Manufactured by establishments engaged primarily in other industries.	1919 1914	93,640 72,132	34,192 39,649	52,941 27,643	1,145 3,657	5,000 852	67 159	94 44	71 64	70 23	60 41	4,607,953 2,295,659	115,259,101 39,421,230	
Steam engines:														
Stationary and portable (not turbine or automobile)...	1919 1914	12,373 12,404	1,921 2,449	7,053 6,335	2,447 2,961	800 1,420	91 191	19 13	2 29	29 .....	2 .....	780,930 805,682	14,491,373 11,821,964	
Stationary turbines.....	1919 1914	2,419 1,307	149 125	857 288	619 280	624 389	48 54	22 45	19 54	16 29	65 43	1,083,971 1,312,718	10,073,324 8,662,174	
Marine (not turbines).....	1919 1914	679 953	..... 447	..... 362	3 40	59 63	145 21	273 18	191 2	..... .....	8 .....	1,203,530 73,670	27,951,268 1,200,071	
Marine turbines <sup>2</sup> .....	1919	2,142	10	182	194	43	.....	1,438	109	93	73	3,993,205	46,101,653	
Other steam engines <sup>2</sup> .....	1919	1,814	770	368	84	498	70	11	.....	7	.....	182,701	3,335,089	
Internal-combustion engines:														
Automobile.....	1919 1914	223,340 71,745	4,840 4,004	217,631 64,706	830 3,035	30 .....	..... .....	..... .....	..... .....	..... .....	..... .....	6,381,625 1,916,293	60,988,532 11,622,951	
Aviation <sup>2</sup> .....	1919	6,747	.....	9	.....	6,738	.....	.....	.....	.....	.....	1,716,245	33,814,333	
Marine.....	1919 1914	31,530 44,167	22,559 35,952	7,717 7,657	556 417	612 112	82 17	3 2	1 .....	..... .....	..... .....	500,243 339,638	20,578,132 7,570,245	
Stationary and portable (not automobile, aviation, or marine).....	1919 1914	312,916 250,722	271,172 228,967	39,772 20,424	1,050 925	885 369	28 24	1 11	3 2	5 .....	..... .....	1,748,638 1,144,991	55,941,323 25,606,905	
Other internal-combustion engines.....	1919 1914	14,758 2,849	14,273 2,700	343 18	23 124	119 7	..... .....	..... .....	..... .....	..... .....	..... .....	163,110 28,300	3,045,552 513,623	
Traction, not locomotives.....	1919 1914	214,958 15,150	8,343 181	203,082 12,200	3,092 2,739	441 29	..... 1	..... .....	..... .....	..... .....	..... .....	5,556,480 424,264	172,667,080 17,651,216	
Water wheels, motors, and turbines.....	1919 1914	12,530 19,239	419 18,434	11,323 106	541 356	167 181	33 51	19 6	6 17	8 10	11 18	637,770 508,391	4,135,959 3,633,008	
Other engines and parts.....	1919 1914	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	52,204,174 9,453,054	
Other foundry and machine-shop products.....	1919 1914	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	50,596,481 6,421,082	
All other products.....	1919 1914	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	24,019,554 7,285,230	

<sup>1</sup> Includes 11 marine steam turbines of 121,000 horsepower.

<sup>2</sup> Figures not available for 1914.

**Summary, by states.**—Table 12 summarizes by states, ranked by their importance as shown by value of products, the total number, horsepower, and value of the various types of engines manufactured. The data are divided into four groups—steam, internal-combustion, traction, and water-driven. In 1919 internal-combustion engines was the leading group, forming

38.5 per cent of the total value and 70.5 per cent of the total number of engines built. Traction engines followed with 38.1 per cent and 25.7 per cent of these items. Steam engines claimed 22.5 per cent of the total value and 2.3 per cent of the total number, while water-driven units formed only nine-tenths of 1 per cent of value and 1.5 per cent of number.

TABLE 12.—NUMBER, HORSEPOWER, AND VALUE OF EACH CLASS OF ENGINES, BY STATES: 1919 AND 1914.

CLASS AND STATE.	NUMBER.		HORSEPOWER (RATED OR INDICATED).		VALUE.		PER CENT DISTRIBUTION.				PER CENT OF INCREASE, <sup>1</sup> 1914-1919.	
	1919	1914	1919	1914	1919	1914	Horsepower.		Value.		Horsepower.	Value.
							1919	1914	1919	1914		
United States.....	836,206	418,526	23,048,454	6,553,050	\$453,123,627	\$88,382,067	100.0	100.0	100.0	100.0	265.4	412.
Total for the industry.....	742,566	346,394	19,340,501	4,258,297	341,608,825	53,190,906	80.8	65.0	75.4	60.1	354.2	542.6
Subsidiary products from other industries.....	93,640	72,132	4,007,953	2,295,550	111,514,802	35,221,161	19.2	35.0	24.6	39.9	100.7	126.6
Steam engines.....	19,427	14,604	7,244,337	2,192,079	101,952,707	21,784,109	100.0	100.0	100.0	100.0	230.5	368.0
Pennsylvania.....	9,545	5,440	2,330,255	932,224	44,287,051	9,632,015	32.2	42.5	43.4	44.2	150.0	359.8
Ohio.....	1,244	412	403,188	84,902	12,759,736	1,190,169	5.6	3.9	12.5	5.5	374.9	964.0
Wisconsin.....	2,066	664	1,222,940	202,804	11,889,907	2,155,133	16.9	9.3	11.7	9.9	503.0	451.7
Indiana.....	88	264	194,050	19,279	6,287,708	172,429	2.7	0.9	0.2	0.8	906.5	3,546.6
New Jersey.....	900	705	233,596	43,768	5,634,776	1,152,957	3.2	2.0	5.5	5.3	433.7	388.7
New York.....	929	1,459	763,187	692,670	3,982,835	3,288,753	10.5	27.0	3.0	15.1	28.8	21.1
Michigan.....	1,795	2,214	148,694	33,451	3,976,451	457,272	2.1	1.5	3.0	2.1	344.5	709.6
California.....	110	34	168,225	2,991	2,630,878	56,142	2.3	0.1	2.9	0.3	5,524.3	5,136.5
Washington.....	64	60	90,650	5,065	2,125,678	123,269	1.3	0.2	2.1	0.6	1,689.7	1,624.4
Illinois.....	732	655	34,266	35,600	970,793	328,935	0.5	1.6	1.0	1.5	-3.5	195.1
All other states.....	1,954	2,757	1,655,286	239,519	7,097,784	3,218,035	22.8	10.9	7.0	14.8	591.1	120.6
Internal-combustion engines.....	589,291	369,473	10,509,861	3,420,222	174,367,872	45,313,734	100.0	100.0	100.0	100.0	206.5	281.8
Michigan.....	197,829	98,509	5,544,380	1,602,081	62,378,949	11,243,023	52.7	46.7	35.8	24.8	246.1	454.8
Wisconsin.....	176,633	99,120	1,607,859	443,995	26,324,601	8,813,350	15.3	13.0	15.1	19.5	202.1	193.7
Pennsylvania.....	29,351	11,984	807,516	170,517	18,146,744	3,437,403	7.7	5.2	10.4	7.6	349.8	427.9
New York.....	9,490	9,382	534,289	181,763	15,990,967	3,812,800	5.1	5.3	9.2	8.4	193.9	319.4
Illinois.....	48,546	35,034	483,255	204,487	8,046,770	3,030,634	4.6	6.0	5.1	6.7	136.3	105.2
Ohio.....	12,986	14,000	332,604	202,284	7,528,724	3,224,263	3.2	5.9	4.3	7.1	84.4	133.5
Indiana.....	50,013	17,864	472,570	191,803	6,470,371	2,130,008	4.5	5.6	3.7	4.7	147.1	203.8
Iowa.....	27,367	50,207	121,044	158,017	6,111,358	3,245,322	1.2	4.6	3.5	7.2	-23.4	88.3
New Jersey.....	1,481	296	184,965	5,019	5,340,895	194,402	1.8	0.1	3.1	0.4	3,686.3	2,047.3
Connecticut.....	5,820	6,829	116,792	79,749	5,303,758	2,013,168	1.1	2.3	3.0	4.4	46.4	103.5
California.....	1,773	1,772	72,224	34,340	3,703,416	1,288,553	0.7	1.0	2.2	2.8	110.3	194.4
Missouri.....	9,754	7,013	58,177	41,596	3,467,091	627,979	0.6	1.2	2.0	2.0	39.9	273.6
Minnesota.....	4,232	3,743	63,621	28,163	948,068	547,131	0.3	0.8	0.5	1.2	22.0	73.3
All other states.....	14,016	13,920	139,555	76,408	3,616,160	1,405,698	1.3	2.2	2.1	3.1	82.7	157.3
Traction engines (not locomotives).....	214,958	15,150	5,556,480	424,264	172,667,089	17,651,216	100.0	100.0	100.0	100.0	1,209.7	878.2
Wisconsin.....	60,654	3,178	1,487,023	133,002	48,084,871	3,787,207	26.8	31.3	27.8	21.5	1,018.0	1,169.7
Michigan.....	68,017	2,061	1,694,555	45,812	42,225,330	2,550,379	30.5	10.8	24.5	14.4	3,598.9	1,555.6
Illinois.....	34,648	1,378	907,624	33,430	34,554,193	2,048,826	16.3	7.9	20.0	11.6	2,615.0	1,680.5
Ohio.....	23,630	1,261	748,071	63,081	16,351,101	2,114,953	13.5	14.9	8.9	12.0	1,085.9	625.8
Minnesota.....	9,905	5,052	164,302	84,124	10,388,184	3,094,307	3.0	19.8	0.0	17.5	95.3	235.7
Iowa.....	10,027	226	285,363	5,298	6,984,315	257,983	5.1	1.2	4.0	1.5	5,286.2	2,697.3
Indiana.....	3,828	850	115,092	17,015	6,694,675	1,625,432	2.1	4.0	3.9	9.2	676.4	311.9
California.....	1,484	360	53,352	18,693	5,280,668	1,148,694	1.0	4.4	3.1	6.5	185.4	356.5
All other states.....	2,765	784	101,038	23,809	3,094,852	1,023,435	1.8	5.6	1.8	5.8	324.0	202.4
Water wheels, motors, turbines, etc.....	12,530	10,239	637,776	508,391	4,135,959	3,633,008	100.0	100.0	100.0	100.0	25.4	13.8
Pennsylvania.....	442	397	249,205	262,170	2,244,718	2,138,912	30.1	51.0	54.3	58.9	-4.9	4.9
Ohio.....	11,217	17,694	167,151	118,163	713,834	832,029	26.2	23.2	17.3	22.0	41.5	-14.2
All other states.....	871	1,148	221,300	128,058	1,177,407	602,067	34.7	25.2	28.5	18.2	72.9	77.8

<sup>1</sup> A minus sign (—) denotes decrease.

<sup>2</sup> In addition, establishments engaged in the industry reported engine parts and other products valued at \$126,910,209 in 1919 and \$23,156,609 in 1914.

**Steam engines.**—Table 13 shows in comparative form the number, horsepower, and value, for 1919 and 1914, of the several kinds of steam engines manufactured. Wherever possible, each class is shown by states, which are ranked in the order of their importance as shown by value of products.

In 1919 marine engines predominated in value of all steam engines, marine turbines claiming 45.2 per cent and marine engines (not turbines) 27.4 per cent of the total. Stationary and portable engines and stationary turbines formed 14.2 and 9.9 per cent, respectively.

## MANUFACTURES.

TABLE 13.—SEGREGATION OF TYPES OF STEAM ENGINES, BY STATES: 1919 AND 1914.

CLASS AND STATE.	1919			1914			CLASS AND STATE.	1919			1914		
	Number of engines.	Indicated horsepower.	Value.	Number of engines.	Indicated horsepower.	Value.		Number of engines.	Indicated horsepower.	Value.	Number of engines.	Indicated horsepower.	Value.
Stationary and portable (not turbine or automobile).....	12,373	780,930	\$14,491,373	12,404	805,082	\$11,821,984	Marine (not turbines)—Continued.						
Pennsylvania.....	6,110	357,412	6,430,142	4,976	319,407	4,150,461	Washington.....	35	60,400	\$1,532,220	(1)	(1)	(1)
Ohio.....	987	89,053	2,720,693	394	84,037	1,189,327	New York.....	50	179,470	941,900	130	13,080	\$240,360
Michigan.....	1,409	37,867	1,699,444	1,987	22,765	326,780	New Jersey.....	19	29,750	493,291	114	3,856	159,397
Wisconsin.....	1,514	72,070	847,816	583	79,765	1,578,617	All other states.....	144	320,630	6,841,054	451	35,413	458,979
Illinois.....	781	28,546	685,848	628	31,370	288,545	Stationary turbines:						
New Jersey.....	147	9,230	382,690	444	19,802	637,909	All states.....	2,419	1,083,071	10,073,324	21,307	1,312,718	8,662,174
New York.....	354	8,681	314,064	1,060	81,082	1,158,623	Marine turbines.....	2,142	3,993,205	46,101,653			
All other states.....	1,001	178,071	1,410,671	2,332	166,704	2,491,702	Pennsylvania.....	1,841	2,080,535	28,924,051			
Marine (not turbines).....	679	1,203,530	27,951,268	953	73,679	1,299,971	New Jersey.....	38	104,050	3,027,640			
Ohio.....	134	312,050	9,931,000	(1)	(1)	(1)	All other states.....	263	1,808,620	14,140,962			
Pennsylvania.....	81	98,430	3,529,718	31	5,664	310,743	Other steam engines:						
Wisconsin.....	140	122,150	2,991,268	(1)	(1)	(1)	All states.....	1,814	182,701	3,335,089			
Michigan.....	67	71,650	1,690,821	227	10,686	130,492							

<sup>1</sup> Included in "All other states" to avoid disclosure of individual operations.<sup>2</sup> Includes 11 marine steam turbines of 121,000 horsepower.

Internal-combustion engines.—Statistics regarding the various types of internal-combustion engines are shown in Table 14. An effort was made to secure data on the various kinds of fuel used, such as gas, gasoline, kerosene, etc., but reliable figures on this subject can not be shown on account of the paucity of the replies to this inquiry. Automobile engines formed the leading class, constituting 35 per cent of

the total value; stationary and portable followed closely, with 32.1 per cent. Aviation engines, for which separate statistics were obtained for the first time at this census, reported 19.4 per cent; and marine engines, which consisted chiefly of motor-boat engines and the small detachable engines built for the propulsion of rowboats, formed 11.8 per cent, the balance being unspecified engines.

TABLE 14.—SEGREGATION OF TYPES OF INTERNAL-COMBUSTION ENGINES, BY STATES: 1919 AND 1914.

CLASS AND STATE.	1919			1914			CLASS AND STATE.	1919			1914		
	Number of engines.	Indicated horsepower.	Value.	Number of engines.	Indicated horsepower.	Value.		Number of engines.	Indicated horsepower.	Value.	Number of engines.	Indicated horsepower.	Value.
Stationary and portable (not automobile, aviation, or marine).....	312,016	1,748,638	\$55,941,323	250,722	1,144,991	\$25,000,905	Marine.....	31,530	500,243	\$20,578,132	44,157	339,638	\$7,570,245
Wisconsin.....	119,844	474,876	14,752,241	83,017	310,700	7,236,506	Connecticut.....	5,635	111,065	5,089,231	6,596	77,192	1,956,130
Pennsylvania.....	12,706	242,387	7,704,127	9,474	124,989	2,932,098	New York.....	1,066	90,656	3,050,305	2,362	48,569	1,020,803
Iowa.....	27,850	120,993	6,109,871	49,842	146,642	2,769,589	Michigan.....	3,377	95,241	2,640,974	15,707	97,937	1,458,468
Michigan.....	51,032	179,172	4,840,024	81,079	117,193	1,983,831	Wisconsin.....	11,597	28,823	1,069,093	12,380	31,575	825,940
New York.....	778	72,778	4,837,000	2,715	37,479	2,055,207	California.....	698	28,580	1,880,171	807	17,010	730,027
Ohio.....	5,480	116,377	4,801,541	9,324	108,502	2,480,394	New Jersey.....	550	35,995	1,709,724	161	3,731	164,081
Indiana.....	45,459	310,907	4,107,952	11,416	45,982	820,140	Missouri.....	74	6,768	1,101,882	(1)	(1)	(1)
Illinois.....	27,232	84,627	2,491,490	28,806	108,317	2,149,170	Minnesota.....	621	9,462	353,221	65	1,192	28,199
Missouri.....	9,080	51,409	2,365,209	7,875	41,075	911,979	Pennsylvania.....	141	4,395	278,874	592	9,294	181,802
California.....	949	27,964	1,365,900	953	16,247	636,323	Washington.....	346	6,093	226,200	45	859	31,615
Minnesota.....	209	7,894	185,424	3,653	26,771	506,432	Ohio.....	504	5,860	209,219	3,660	26,177	534,747
New Jersey.....	112	1,610	88,799	133	1,228	26,546	Illinois.....	184	2,427	61,992	654	5,966	153,331
Washington.....	24	526	29,110	96	1,195	28,400	Indiana.....	65	656	24,656	57	871	15,376
Connecticut.....	75	630	25,737	148	1,667	46,759	All other states.....	772	74,187	1,082,584	1,171	19,265	450,661
All other states.....	11,986	56,489	2,236,898	14,191	56,004	1,123,528	Aviation.....	6,747	1,716,245	33,814,333	(2)	(2)	(2)
Automobile.....	223,340	6,381,625	60,988,532	71,745	1,916,293	11,622,961	New York.....	607	175,300	5,023,633	(2)	(2)	(2)
Michigan.....	133,719	4,047,707	35,093,951	49,723	1,386,851	7,800,724	All other states.....	6,140	1,540,945	28,785,700	(2)	(2)	(2)
Wisconsin.....	37,819	1,067,204	8,788,341	3,123	96,720	703,617	Other internal-combustion engines.....	14,758	163,110	3,045,552	2,840	28,300	513,623
Illinois.....	21,130	390,201	6,393,288	5,279	88,492	661,203	Wisconsin.....	7,373	16,952	814,920	(1)	(1)	(1)
Pennsylvania.....	15,392	401,125	5,043,166	1,918	45,234	323,413	All other states.....	7,385	146,158	2,230,632	2,840	28,300	513,623
Indiana.....	4,489	161,006	2,337,763	5,070	131,740	1,105,727							
New York.....	6,139	195,655	2,175,029	4,185	86,515	405,080							
All other states.....	4,652	92,827	1,167,004	2,447	80,641	623,197							

<sup>1</sup> Included in "All other states" to avoid disclosure of individual operations.<sup>2</sup> Figures not available for 1914.

GENERAL TABLES.

Table 15 gives, for 1919 and 1914, by states, the number of establishments, average number of wage earners, primary horsepower, wages, cost of materials, and value of products for the engine industry.

Table 16 presents, for 1919, statistics in detail for the industry as a whole, and for each state that can be shown separately without the possibility of disclosing the operations of individual establishments.

TABLE 15.—COMPARATIVE SUMMARY, BY STATES: 1919 AND 1914.

STATE.	Cen- sus year.	Num- ber of estab- lish- ments.	Wage earn- ers (aver- age num- ber).	Primary horse- power.	Wages.	Cost of mate- rials.	Value of prod- ucts.	STATE.	Cen- sus year.	Num- ber of estab- lish- ments.	Wage earn- ers (aver- age num- ber).	Primary horse- power.	Wages.	Cost of mate- rials.	Value of prod- ucts.
					Expressed in thousands.								Expressed in thousands.		
United States.....	1910 1914	370 446	77,617 20,657	100,021 63,047	\$105,435 21,421	\$217,551 31,460	\$464,775 72,121	Missouri.....	1919 1914	10 6	782 307	1,934 1,110	\$947 231	\$1,501 590	\$4,166 1,172
California.....	1919 1914	22 24	2,231 813	10,526 1,721	3,275 733	5,646 1,429	12,687 2,710	New Jersey.....	1919 1914	15 14	2,392 677	7,812 2,772	3,592 514	5,416 682	19,387 1,756
Connecticut.....	1919 1914	16 18	1,764 1,075	4,882 1,783	2,104 800	3,294 1,029	7,309 2,552	New York.....	1919 1914	31 48	4,528 1,973	17,196 5,132	6,624 1,384	10,102 1,909	29,822 4,599
Illinois.....	1919 1914	25 30	8,645 1,800	16,152 2,891	11,750 1,412	23,644 1,842	45,741 3,949	Ohio.....	1919 1914	44 47	6,218 2,962	12,961 9,617	8,033 1,983	20,344 2,837	42,851 6,861
Indiana.....	1919 1914	16 21	2,853 1,311	3,853 2,050	3,596 782	7,689 1,291	14,473 2,808	Pennsylvania.....	1919 1914	34 50	9,711 5,222	30,179 12,375	12,933 3,521	18,836 4,728	52,574 11,392
Iowa.....	1919 1914	17 20	2,739 1,197	7,799 1,881	3,046 925	8,894 1,320	17,611 3,586	Washington.....	1919 1914	13 8	546 21	1,519 50	774 22	1,125 32	2,527 85
Michigan.....	1919 1914	35 48	14,258 4,427	30,488 9,062	21,363 3,387	57,051 5,962	101,989 12,369	Wisconsin.....	1919 1914	36 40	17,782 6,010	39,168 7,596	22,716 4,517	45,067 5,875	90,953 13,063
Minnesota.....	1919 1914	14 17	1,529 508	2,235 1,603	1,908 334	4,580 658	12,946 1,950	All other states.....	1919 1914	42 49	1,639 1,204	3,317 3,395	2,168 867	4,362 1,276	9,739 3,209

## MANUFACTURES.

TABLE 16.—DETAILED STATEMENT FOR ENGINES, STEAM, GAS, AND WATER, BY STATES: 1919.

STATE.	Number of establishments.	PERSONS ENGAGED IN THE INDUSTRY.										WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.					EXPENSES.		
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks, etc.		Wage earners.				Total.	16 and over.		Under 16.		Capital.	Salaries and wages.		
					Male.	Female.	Average number.	Number, 15th day of—		Male.		Female.	Male.	Female.	Officials.		Clerks, etc.		
								Maximum month.	Minimum month.										
United States.....	370	96,286	93	3,702	10,593	4,191	77,617	Ja 90,102	My 70,193	85,053	83,063	1,872	109	9	Dollars. 454,124,733	Dollars. 12,895,475	Dollars. 18,010,564		
California.....	22	2,604	9	105	234	85	2,231	Ja 2,715	Oct 1,691	2,659	2,625	32	2		13,267,811	619,784	394,252		
Colorado.....	3	12		3	3		6	Mh 8	Ja 5	6	6				145,932	3,645	3,900		
Connecticut.....	16	2,090	6	116	124	81	1,764	Ja 2,136	Oct 1,547	1,575	1,524	48	3		8,990,784	412,493	265,015		
Illinois.....	25	10,335	6	526	803	355	8,045	Ja 9,821	Jy 7,785	8,784	8,603	180	1		47,823,665	1,255,311	1,908,567		
Indiana.....	16	3,547	5	111	409	109	2,853	Ja 3,268	Jy 2,530	3,088	2,970	118			16,892,903	270,933	606,054		
Iowa.....	17	3,482	2	208	302	231	2,739	Mh 3,536	Au 1,489	2,929	2,905	22	2		13,427,407	578,385	511,213		
Kansas.....	5	254	1	15	9	43	186	Mh 219	No 151	189	181	8			782,212	34,095	32,502		
Michigan.....	35	16,050	4	492	777	619	14,268	Ja 16,601	Apr 10,480	16,328	15,786	587	5		62,506,809	1,870,965	2,039,218		
Minnesota.....	14	2,377	1	118	576	153	1,529	Mh 1,893	Dec 1,654	1,623	1,618	5			21,952,666	346,530	994,026		
Missouri.....	10	1,042	2	107	85	66	782	No 913	Mh 671	937	937				4,419,235	338,265	130,530		
New Jersey.....	15	4,932	4	155	2,310	71	2,392	Ja 5,057	No 1,287	2,622	2,609	11	2		24,962,440	817,298	1,640,197		
New York.....	31	5,677	5	312	496	336	4,528	Fe 6,819	Jun 3,372	6,053	6,012	38	3		33,011,539	1,024,768	845,985		
Ohio.....	44	7,554	9	265	782	280	6,218	Au 6,667	My 5,673	6,341	6,301	40			37,221,036	1,012,009	1,377,454		
Pennsylvania.....	34	12,358	19	318	1,512	798	9,711	Dec 10,671	My 8,989	10,625	10,423	188	14		58,544,641	1,262,931	3,026,299		
Texas.....	3	32		2	3		27	Se 31	Fe 24	27	27				242,707	5,096	3,370		
Washington.....	13	639	6	47	31		540	Jy 712	Fe 233	552	551		1		2,609,331	175,562	63,817		
Wisconsin.....	36	21,497	3	772	1,971	969	17,782	Dec 20,693	Jun 14,626	19,321	18,662	578	72	9	98,070,203	2,425,532	3,245,831		
All other states <sup>1</sup> .....	31	1,744	11	121	106	86	1,420			1,394	1,373	17	4		9,234,452	432,873	269,328		

STATE.	EXPENSES—continued.							Value of products.	Value added by manufacture.	POWER.							Electric horsepower generated in establishments reporting.			
	Salaries and wages—Con.		Rent and taxes.		For materials.		For contract work.			Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.	Primary horsepower.							
	Wage earners.	For contract work.	Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.							Total.	Owned.				Rented. <sup>4</sup>		
														Steam engines (not turbines).	Steam turbines.	Internal-combustion engines.			Water power. <sup>3</sup>	
United States.....	Dollars. 105,435,455	Dollars. 936,389	Dollars. 277,061	Dollars. 21,322,012	Dollars. 211,556,910	Dollars. 5,993,851	Dollars. 464,774,735	Dollars. 247,223,064		190,021	42,737	27,845	15,773	335	103,331	110,412				
California.....	3,274,637	301,625	21,920	589,993	5,525,159	120,675	12,687,250	7,041,415		10,526			129		10,397					
Colorado.....	6,314	536	360	630	10,576	350	26,525	15,599		32					32					
Connecticut.....	2,104,281	15,115	13,117	193,785	3,194,092	99,203	7,309,474	4,015,579		4,882	50	400	1,670		2,762	5,807				
Illinois.....	11,755,850	234	22,695	1,056,644	22,959,101	685,554	45,741,267	22,097,112		16,152	3,465	200	727	50	11,710	1,587				
Indiana.....	3,695,827		4,031	233,290	7,555,313	133,331	14,472,788	6,784,144		3,853	553		1,740		1,500					
Iowa.....	3,645,977	3,925	10,823	451,623	8,001,234	293,264	17,610,778	8,716,280		7,799	2,085		52		5,662	878				
Kansas.....	188,655		3,448	5,866	426,132	19,813	1,022,135	576,190		239			57		182	20				
Michigan.....	21,362,743	500	43,014	5,103,583	50,214,185	830,508	101,989,440	44,938,747		30,488	3,350	50	79		27,009	8,020				
Minnesota.....	1,907,956	318,729	0,411	331,288	4,481,878	97,907	12,940,297	8,366,512		2,235	50		16		2,169					
Missouri.....	947,143	35,029	6,369	311,059	1,457,737	43,165	4,166,336	2,665,434		1,934	150		1,524		260	2,225				
New Jersey.....	3,592,302	28,262	9,334	1,211,733	5,255,907	159,676	19,387,212	13,971,620		7,812	2,083	1,944	62		3,723	3,070				
New York.....	6,623,685	86,014	47,294	929,457	9,773,876	328,219	29,822,230	19,720,191		17,196	1,136	870	1,642	150	13,398	4,409				
Ohio.....	8,032,002	1,249	31,053	1,060,944	19,988,093	355,688	42,850,777	22,506,896		12,061	4,455	81	2,762		5,663	8,954				
Pennsylvania.....	12,933,325	14,256	3,987	4,028,108	17,931,400	904,359	52,574,026	33,738,267		30,179	2,913	15,100	2,565		9,601	25,340				
Texas.....	28,985			1,890	33,968	2,020	99,904	63,916		97			69		28					
Washington.....	774,258	5,000	13,228	49,852	1,095,500	29,966	2,527,275	1,401,800		1,519					1,519					
Wisconsin.....	22,716,433	17,342	19,941	4,527,420	43,281,200	1,785,924	90,953,496	45,886,312		39,168	21,568	9,200	2,426		5,974	48,161				
All other states. <sup>2</sup> .....	1,944,372	108,576	11,036	334,847	3,770,399	98,738	8,587,569	4,717,932		2,940	879		253	135	1,682	472				

<sup>1</sup> Same number reported for one or more other months.<sup>2</sup> All other states embrace: Alabama, 1 establishment; Arkansas, 1; Delaware, 1; Florida, 1; Kentucky, 2; Louisiana, 1; Maine, 3; Maryland, 3; Massachusetts, 4; Nebraska, 2; New Hampshire, 2; North Dakota, 1; Oklahoma, 1; Oregon, 3; South Carolina, 1; South Dakota, 1; Tennessee, 1; Vermont, 1; Virginia, 1.<sup>3</sup> Includes water wheels and turbines (irrespective of ownership of water supply), and water motors (operated by water from city mains).<sup>4</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants).

# LOCOMOTIVES.

General character of the industry.—The statistics for the industry represent the establishments devoted exclusively to the manufacture of locomotives or those in which locomotives constituted the predominating product. In many establishments, however, minor or subsidiary products are manufactured, the value of which is necessarily included in the total value of the products of the factory reporting. In 1919 the total value of these products was \$23,967,199, including locomotive and engine parts, steam and gas stationary engines, other foundry and machine-shop products, and repair work.

This classification includes the manufacture of steam locomotives of all varieties, both standard and narrow gauge. Some electric locomotives are also made by plants covered in this classification, but the majority are made by those in the electrical machinery and electric railway car industries. The manufacture of tractors for farm and road use is not included, but is

shown in connection with "Engines, steam, gas, and water" in Table 11.

Comparative summary.—Table 17 summarizes the statistics for each census since 1904, with percentages of increase for each five-year period. With few exceptions, increases are noted at each succeeding census. The large increases, however, from 1914 to 1919, in salaries and wages, cost of materials, and value of products are due largely to a general rise of prices and wages following the World War, and do not, therefore, fairly measure the growth of the industry for that period. A truer index of the conditions is found in the average number of wage earners and primary horsepower. The addition of the Federal income tax since 1914 will account for the increase in "Rent and taxes."

Detailed statement.—Table 18 gives, for 1919 and for 1914, statistics in detail for the industry as a whole.

TABLE 17.—COMPARATIVE SUMMARY: 1919, 1914, 1909, AND 1904.

	1919	1914	1909	1904	PER CENT OF INCREASE. <sup>1</sup>		
					1914-1919	1909-1914	1904-1909
Number of establishments.....	17	19	16	15			
Persons engaged.....	28,742	19,047	16,945	25,979	50.9	12.4	34.8
Proprietors and firm members.....	1		7	9			
Salaried employees.....	2,026	1,650	2,029	1,104	22.3	-18.4	74.3
Wage earners (average number).....	26,715	17,391	14,909	24,866	53.6	16.6	-39.9
Primary horsepower.....	187	50,373	35,102	29,806	92.9	43.5	17.8
Capital.....	\$138,275,823	\$86,413,199	\$52,059,597	\$38,421,048	60.0	66.0	35.5
Salaries and wages.....	43,576,957	13,862,134	11,211,385	17,458,274	214.4	23.0	-35.8
Salaries.....	4,778,319	2,776,759	2,297,119	1,675,289	72.1	20.9	37.1
Wages.....	38,798,641	11,085,375	8,914,266	15,782,985	250.0	24.4	-43.5
Paid for contract work.....				999			
Rent and taxes.....	5,425,737	417,425	193,315	<sup>2</sup> 152,644	1,199.8	115.9	26.6
Cost of materials.....	72,375,950	23,546,118	15,059,983	27,702,930	207.4	56.3	-45.6
Value of products.....	156,269,730	43,374,141	31,582,302	59,552,092	260.3	37.3	-47.0
Value added by manufacture <sup>3</sup> .....	83,893,780	19,828,023	16,522,319	31,849,162	323.1	20.0	-48.1

<sup>1</sup> A minus sign (—) denotes decrease; percentages are omitted where base is less than 100. <sup>2</sup> Exclusive of internal revenue. <sup>3</sup> Value of products less cost of materials.

TABLE 18.—DETAILED STATEMENT: 1919 AND 1914.

	1919		1914			1919	1914
Number of establishments <sup>1</sup> .....	17		19		Salaries and wages.....	\$43,576,957	\$13,862,134
Persons engaged.....	28,742		19,047		Officials.....	\$1,675,194	\$1,453,255
Proprietors and firm members.....	1				Clerks, etc.....	\$3,103,152	\$1,323,504
Salaried officers, superintendents, and managers.....	325		525		Wage earners.....	\$38,798,641	\$11,085,375
Clerks and other subordinate salaried employees.....	1,701		1,131		Rent and taxes.....	\$5,425,737	\$417,425
Male.....	1,449		1,035		Rent of factory.....	\$554	\$300
Female.....	252		96		Taxes (including Federal, state, county, and local).....	\$5,425,183	\$416,825
Wage earners—					Cost of materials.....	\$72,375,950	\$23,546,118
Average number.....	26,715		17,391		Principal materials.....	\$69,268,472	\$22,355,528
Number, 15th day of the month—					Fuel and rent of power.....	\$3,107,478	\$1,190,590
Maximum month and number.....	Jan 35,659	Jan 22,364			Value of products.....	\$156,269,730	\$43,374,141
Minimum month and number.....	Dec 19,837	Nov 12,535			Value added by manufacture.....	\$83,893,780	\$19,828,023
Wage earners Dec. 15, or nearest representative day.....	19,877	16,548			Primary horsepower.....	97,187	50,373
16 years of age and over.....	19,836	16,547			Locomotives, steam <sup>2</sup> —		
Male.....	19,734	16,539			Number.....	3,411	( <sup>3</sup> )
Female.....	102	8			Value.....	\$139,225,420	\$39,043,359
Under 16 years of age.....	41	1					
Male.....	41	1					
Female.....							
Capital.....	\$138,275,823		\$86,413,199				

<sup>1</sup> Comprises in 1919: Arkansas, 1 establishment; Georgia, 1; Iowa, 1; New Jersey, 1; New York, 2; Ohio, 2; Pennsylvania, 8; Virginia, 1. In 1914: Georgia, 2; Iowa, 1; New Hampshire, 1; New Jersey, 2; New York, 8; Ohio, 1; Pennsylvania, 8; Virginia, 1.

<sup>2</sup> Includes in 1919, 105 steam locomotives valued at \$5,825,096, manufactured by steam-railroad repair shops, and 54 valued at \$2,508,674, produced as subsidiary products by establishments engaged primarily in other industries. In addition to steam locomotives there were 251 electric locomotives of all types reported, the value for which can not be given without disclosure of the operations of individual establishments.

<sup>3</sup> No figures available.

## AIRCRAFT.

**General character of the industry.**—Establishments included in this classification manufacture monoplanes, biplanes, and triplanes (both airplanes and seaplanes), and free and captive balloons. Figures for this industry, which has been developed during the past two decades, were not shown separately prior to 1914. The data for any establishments that were in operation at the census of 1909 were included with those for "motorcycles, bicycles, and parts." This classification covers only the establishments that produce the complete machine.

Statistics for the manufacture of airplane tires, engines, and other equipment, when made by establish-

ments not manufacturing the complete machine, are included in other classifications, such as "rubber tires, tubes, and rubber goods, not elsewhere specified," "engines, steam, gas, and water," etc.

**Comparative summary.**—The growth in this industry since 1914 is evidenced in Table 19. While a certain proportion of the increases from 1914 to 1919, in salaries and wages, cost of materials, and value of products, is due to a general rise of prices and wages following the World War, a truer index of the conditions is found in the increases in the average number of wage earners and primary horsepower.

TABLE 19.—COMPARATIVE SUMMARY: 1919 AND 1914.

	1919	1914	Per cent of increase, <sup>1</sup> 1914-1919.		1919	1914	Per cent of increase, <sup>1</sup> 1914-1919.
Number of establishments.....	31	16	.....	Salaries and wages.....	\$6,907,430	\$196,261	3,419.5
Persons engaged.....	4,202	222	1,792.8	Salaries.....	2,000,690	61,434	3,156.6
Proprietors and firm members.....	14	9	.....	Wages.....	4,906,740	134,827	3,539.3
Salaried employees.....	645	45	.....	Paid for contract work.....	13,045	12,428	9.8
Wage earners (average number).....	3,543	168	2,008.9	Rent and taxes.....	687,700	25,886	2,556.6
Primary horsepower.....	12,512	195	6,316.4	Cost of materials.....	7,126,965	133,969	5,221.1
Capital.....	\$17,753,875	\$401,301	4,324.1	Value of products.....	14,372,643	789,872	1,719.6
				Value added by manufacture <sup>2</sup> .....	7,245,678	655,933	1,004.6

<sup>1</sup> Percentages are omitted where base is less than 100.

<sup>2</sup> Value of products less cost of materials.

**Special statistics.**—Table 20 shows for 1919 the number and value of airplanes and seaplanes built and under construction, and value of engines, aircraft parts, subsidiary products, and amount received for repair work. The number of establishments reported

for this industry in 1914 was 16; the production of airplanes, seaplanes, and parts for that year was valued at \$481,022; the receipts for repair work amounted to \$209,481; and the value of "All other products" was reported as \$99,369.

TABLE 20.—DETAILED STATISTICS OF NUMBER AND VALUE: 1919.

PRODUCT.	Number.	Value.	PRODUCT.	Number.	Value.
Total.....	.....	\$14,372,643	Under construction.....	341	\$1,658,670
Airplanes.....	432	3,466,462	Engines.....	.....	253,244
Seaplanes.....	230	4,580,016	Parts.....	.....	2,601,995
			All other products, including repair work.....	.....	1,812,266

Detailed statement.—Table 21 presents, for 1919 and 1914, statistics in detail for the industry as a whole. Only New York state can be shown separately without the possibility of disclosing the operations of

individual establishments. The greater part of this production was the completing of contracts made for the construction of airplanes for use in the World War.

TABLE 21.—DETAILED STATEMENT: 1919 AND 1914.

	1919	1914		1919	1914
Number of establishments <sup>1</sup> .....	31	16	Capital.....	\$17,753,875	\$401,301
Persons engaged.....	4,202	222	Salaries and wages.....	\$0,907,430	\$190,261
Proprietors and firm members.....	14	9	Officials.....	\$325,357	\$41,149
Salaried officers, superintendents, and managers.....	153	21	Clerks, etc.....	\$1,175,333	\$20,285
Clerks and other subordinate salaried employees.....	492	24	Wage earners.....	\$4,606,740	\$134,827
Male.....	312	16	Contract work.....	\$13,045	\$12,428
Female.....	180	8	Rent and taxes.....	\$687,700	\$25,886
Wage earners—			Rent of factory.....	\$64,805	\$13,850
Average number.....	3,543	168	Taxes (including Federal, state, county, and local).....	\$622,895	\$12,036
Number, 15th day of the month—			Cost of materials.....	\$7,126,065	\$133,039
Maximum month and number.....	Jan. 5,493	Nov. 211	Principal materials.....	\$0,863,271	\$130,258
Minimum month and number.....	Oct. 2,799	June 144	Fuel and rent of power.....	\$268,664	\$3,681
Wage earners Dec. 15, or nearest representative day.....	3,474	211	Value of products.....	\$14,372,643	\$789,872
16 years of age and over.....	3,468	209	Value added by manufacture.....	\$7,245,678	\$655,933
Male.....	3,256	208	Primary horsepower.....	12,512	106
Female.....	212	1			
Under 16 years of age.....	6	2			
Male.....	6	2			
Female.....					

<sup>1</sup> Comprises in 1919: California, 2 establishments; Connecticut, 1; Illinois, 1; Indiana, 1; Louisiana, 1; Maryland, 1; Massachusetts, 2; Missouri, 2; Nebraska, 1; New Jersey, 1; New York, 10; Ohio, 4; Pennsylvania, 1; Rhode Island, 1; Washington, 1; West Virginia, 1. In 1914: California, 3; Connecticut, 1; Illinois, 2; Iowa, 1; Massachusetts, 1; Missouri, 1; New Jersey, 1; New York, 3; Ohio, 1; Rhode Island, 1; Washington, 1.



## AMMUNITION, FIREARMS, AND ORDNANCE AND ACCESSORIES.

**Scope and relationship of the industries.**—The statistics presented in this report relate to the classes of establishments that produce as manufactured products (1) ammunition, (2) firearms, and (3) ordnance and accessories. Each is treated by the Census Bureau as a separate industry, but they are to a certain extent interrelated, and the statistics are here presented as a group, in conjunction with those for the governmental establishments manufacturing these products.

During the World War many establishments in other lines of manufacture produced large quantities of ammunition and related war material. Such establishments were classified according to the products of chief value in 1919, ammunition, firearms, ordnance, or other industry, as the case might be. If an establishment was engaged primarily in the manufacture of products pertaining to another industry, but incidentally produced ammunition, firearms, or ordnance, the subsidiary products were included as by-products in the special statistics relating to the section of this report to which they appertain, although other data regarding the establishment were included in the general statistics for the industry to which the establishment belonged.

The census of 1919 was the first to employ a special schedule for these industries. At prior censuses the establishments reported, with respect to products, total values only.

**Detailed statistics for the group—Governmental and commercial establishments.**—Table 1 presents the general statistics for the commercial in conjunction with the corresponding governmental establishments. The industrial group as a whole employed 73,309 wage earners in 1919, this being the average number for the

year, of which 62 per cent were in commercial and 38 per cent in governmental establishments. A comparison of the magnitude of operations, based upon value of products, credits the commercial establishments with 67.6 per cent and the governmental plants with 32.4 per cent. The figures for products, as given in this table, do not include the products of commercial establishments in other lines of manufacture.

**Products, governmental and commercial establishments.**—Table 2 presents the statistics for products, by commodity groups, for all classes of establishments. This includes for the commercial establishments a large production reported by plants outside of the respective classified industries. The products reported for the commercial establishments necessarily include the value of some products other than ammunition, firearms, or ordnance, these amounting to \$24,866,094. Deducting this amount from the total reported for commercial establishments and also from the grand total, it gives figures which can be taken as a measure of the relative importance of the respective product groups, and on this basis the production of ordnance and accessories constituted 45.1 per cent of the total for all establishments, ammunition 40.2 per cent, and firearms 14.7 per cent; the proportions for commercial establishments being ammunition 48.2 per cent, ordnance and accessories 40.3 per cent, and firearms 11.5 per cent; and for governmental establishments, ordnance and accessories 58.7 per cent, firearms 23.6 per cent, and ammunition 17.7 per cent.

Of the total value of the output, commercial establishments reported 88.5 per cent of the ammunition, 57.9 per cent of the firearms, and 65.9 per cent of the ordnance and accessories.

# AMMUNITION, FIREARMS, AND ORDNANCE AND ACCESSORIES.

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TABLE 1.—DETAILED STATISTICS FOR THE GROUP—GOVERNMENTAL AND COMMERCIAL ESTABLISHMENTS: 1919.

	Total.	Governmental.	Commercial.		Total.	Governmental.	Commercial.
Number of establishments <sup>1</sup> .....	105	11	94	Paid for contract work.....	\$2,076,685	\$1,928,679	\$148,006
Persons engaged.....	85,027	31,422	53,605	Rent and taxes.....	\$12,230,015	\$8,090	\$12,227,925
Proprietors and firm members.....	22	.....	22	Cost of materials.....	\$110,917,577	\$38,609,533	\$72,308,044
Salaried officers, superintendents, and managers.....	2,498	751	1,745	Principal materials.....	\$105,981,550	\$37,163,090	\$68,818,460
Clerks, etc.....	9,200	2,793	6,407	Fuel and rent of power.....	\$4,936,027	\$1,446,443	\$3,489,584
Male.....	5,119	1,439	3,680	Value of products.....	\$277,829,909	\$90,114,688	\$187,715,221
Female.....	4,081	1,354	2,727	Value added by manufacture <sup>2</sup> .....	\$166,912,443	\$51,605,260	\$115,407,177
Wage earners—				Power:			
Average number.....	73,309	27,878	45,431	Primary horsepower.....	166,564	60,617	105,947
Number 15th day of month—				Owued.....	82,933	38,350	44,583
Maximum month.....	January.	January.	January.	Steam.....	74,416	32,790	41,626
Number.....	112,479	32,845	79,634	Engines.....	21,409	6,904	14,505
Minimum month.....	September.	September.	August.	Turbines.....	53,007	25,856	27,151
Number.....	62,137	26,100	35,942	Internal-combustion engines.....	2,508	80	2,428
Wage earners Dec. 15 or nearest representative day.....	74,322	27,186	47,136	Water wheels and turbines.....	6,000	5,510	490
16 and over—				Rented electric.....	83,631	22,267	61,364
Male.....	65,221	26,378	38,843	Electric, generated in establishments reporting.....	106,335	74,747	31,588
Female.....	8,889	790	8,103	Fuel consumed:			
Under 16—				Coal—			
Male.....	164	22	142	Anthracite, tons (2,240 pounds).....	75,035	13,002	62,033
Female.....	48	.....	48	Bituminous, tons (2,000 pounds).....	435,932	139,970	295,962
Capital.....	\$583,856,039	\$351,980,451	\$231,875,588	Coke, tons (2,000 pounds).....	8,855	1,872	6,983
Salaries and wages.....	112,151,182	45,869,626	66,281,556	Fuel oils, barrels.....	328,685	116,438	207,197
Salaries—				Gasoline and other volatile oils, barrels.....	11,334	6,581	4,753
Officials.....	9,404,001	1,917,025	7,486,976	Gas, 1,000 cubic feet.....	3,114,898	27,594	3,087,304
Clerks, etc.....	10,016,923	3,700,172	6,316,751				
Wages.....	92,730,258	40,252,420	52,477,829				

<sup>1</sup> Distributed by states as follows:  
Governmental, 11—California, 1; District of Columbia, 1; Georgia, 1; Illinois, 1; Massachusetts, 2; New York, 2; Pennsylvania, 1; Rhode Island, 1; and Virginia, 1.  
Commercial, 94—California, 3; Colorado, 1; Connecticut, 16; Illinois, 2; Indiana, 3; Maryland, 2; Massachusetts, 15; Michigan, 4; Minnesota, 2; New Jersey, 3; New York, 14; Ohio, 6; Pennsylvania, 14; Rhode Island, 1; and Wisconsin, 3.  
<sup>2</sup> Value of products less cost of materials.

TABLE 2.—PRODUCTS—GOVERNMENTAL AND COMMERCIAL ESTABLISHMENTS: 1919.

PRODUCT.	Total.	Governmental.	Commercial.	PRODUCT.	Total.	Governmental.	Commercial.
Total value.....	\$368,973,514	\$90,114,688	\$278,858,826	Ammunition.....	\$138,366,040	\$15,908,181	\$122,457,859
The classified industries.....	277,829,909	90,114,688	187,715,221	Firearms.....	50,477,201	21,264,751	29,212,450
Subsidiary products, ammunition, firearms, and ordnance, of establishments outside of the industrial group.....	91,143,605	.....	91,143,605	Ordnance and accessories.....	155,264,179	52,941,756	102,322,423
				All other products.....	24,866,004	.....	24,866,004

# AMMUNITION.

## GENERAL STATISTICS.

**General character of the industry.**—This report not only covers the commercial manufacture of all kinds of ammunition in the strict sense, both for small arms and for artillery, but for convenience includes navy depth charges and torpedoes; safety and miners' squibs; common fuses and fuses for shells; bombs; hand, rifle, and signal grenades; detonators and detonating caps; gas shells; bomb lances; and railroad torpedoes.

The ammunition industry, in census usage, does not include the manufacture of dynamite and other explosives for agricultural use, nor that of torpedoes, or "cartridges" used in oil wells. Neither does it cover establishments engaged primarily in the manufacture of rockets, colored fire, and similar products, which are classified under "Fireworks."

Detailed statistics of products were first reported at the present census. Prior thereto there was no special schedule, and the establishments reported only the total value of products, though the steel mills manufacturing ordnance reported tonnage and value of same.

Statistics for establishments operated by the Federal Government are not here included, but are given in the introductory section for the combined industries, ammunition, firearms, and ordnance.

**Comparative summary.**—Table 3 summarizes the statistics for the censuses from 1879 to 1919, inclusive, with percentages of increase. Earlier censuses reported for the ammunition industry the number of establishments, number of wage earners, and value of products, as follows: In 1869, 17 establishments, 657 wage earners, and products valued at \$2,484,720; in 1859, 16 establishments, 400 wage earners, and \$601,840 in value of products; and in 1849, 7 establishments, 85 wage earners, and \$1,018,550 in value of products.

**Principal states, ranked by value of products.**—Table 4 shows the more important statistics, by states, ranked according to value of products. The state of Maryland, which ranked second in the industry, and Illinois, which ranked fifth according to the value of products, are included with "All other states," as the statistics for these states can not be reported separately.

**Persons engaged in the industry.**—The age classification of the average number of wage earners in Table 5 is an estimate obtained by the method described in the "Explanation of terms." Figures for states will be found in Table 15.

**Wage earners, by months.**—The statistics presented in Table 6 are intended to show the steadiness of employment, or the reverse, in accordance with the industrial conditions which obtained in 1919. The industry gave employment to a relatively large number of

female wage earners, and the figures therefore are given for the leading states. Of the total number employed in the industry, 31.5 per cent were females. Massachusetts shows the highest proportion, namely, 63.4 per cent of the total number for the state, followed by Connecticut with 30.5 per cent, Pennsylvania 28.7 per cent, New York 20.8 per cent, and New Jersey 18.9 per cent.

**Average number of wage earners, by prevailing hours of labor, per week.**—Table 7 shows a marked shortening of the working day since 1914. In that year only 1.7 per cent of the wage earners were included in the group "48 and under," as against 47.3 per cent in 1919. On the other hand, in 1914 the "60" and "Between 54 and 60" groups constituted 79.5 per cent of the total number of wage earners, as against 5 per cent in 1919.

**Size of establishments, by average number of wage earners.**—The industry is one of large units, as shown in Table 8. In 1919, 18 establishments with 97.1 per cent of the total number of wage earners were in the groups employing over 100 wage earners.

**Size of establishments, by value of products.**—The increase in the ammunition industry, due to the World War, together with the inflation of values, has resulted in a marked shift from lower to higher groups as shown in Table 9. In 1914 the average value of products per establishment was \$963,765, and in 1919, \$2,096,148.

**Character of ownership.**—In 1919, of the 42 establishments, 38 were owned by corporations and 4 were under partnership or other form of ownership. In 1914, of the 32 establishments in the industry, 24 were corporations, 3 were owned by individuals, and 5 were in the group "All other." Table 10 shows the value of products of establishments under corporate ownership in 1919 was \$87,895,531, or 99.8 per cent of the total value of products for all establishments, and in 1914, \$30,535,656, or 99 per cent.

**Number and horsepower of types of prime movers.**—The total horsepower reported in 1919, as compared with that of 1914, shows an increase of 27,774, or 244.7 per cent. Electric power is the chief factor as shown in Table 11. In 1919 purchased electric power constituted 44.9 per cent of the total primary power as compared with 8.1 per cent in 1914, and, moreover, a large proportion of the owned power was employed in electric generation and so used.

**Fuel consumed.**—Table 12 presents the statistics for fuel consumed in the industry, by kinds, for 1919 and 1914 and by states for 1919. The figures for gas include both natural and manufactured gas.

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TABLE 3.—COMPARATIVE SUMMARY: 1919, 1914, 1909, 1904, 1899, 1889, AND 1879.

	1919	1914	1909	1904	1899	1889	1879	PER CENT OF INCREASE.					
								1914-1919	1909-1914	1904-1909	1899-1904	1889-1899	1879-1889
Number of establishments.....	42	32	39	32	33	35	4	.....	.....	.....	.....	.....	.....
Persons engaged.....	27,471	12,715	( <sup>2</sup> )	7,799	5,435	( <sup>2</sup> )	( <sup>2</sup> )	116.1	.....	.....	43.5	.....	.....
Proprietors and firm members.....	10	16	( <sup>2</sup> )	389	204	( <sup>2</sup> )	( <sup>2</sup> )	285.2	.....	.....	90.7	.....	.....
Salaried employees.....	4,645	1,206	( <sup>2</sup> )	.....	.....	( <sup>2</sup> )	( <sup>2</sup> )	.....	.....	.....	.....	.....	.....
Wage earners (average number).....	22,816	11,493	8,713	7,410	5,231	2,153	1,066	98.5	31.9	17.6	41.7	142.4	102.4
Primary horsepower.....	39,128	11,354	10,317	5,056	2,980	( <sup>2</sup> )	( <sup>2</sup> )	244.6	10.1	104.1	69.7	.....	.....
Capital.....	\$94,568,643	\$37,454,175	\$26,344,000	\$12,117,000	\$6,719,000	( <sup>2</sup> )	( <sup>2</sup> )	152.5	42.2	117.4	80.3	.....	.....
Salaries and wages.....	31,194,843	8,333,656	( <sup>2</sup> )	4,623,912	2,081,522	( <sup>2</sup> )	( <sup>2</sup> )	274.3	.....	.....	57.7	.....	.....
Salaries.....	7,607,151	1,582,670	( <sup>2</sup> )	591,602	370,598	( <sup>2</sup> )	( <sup>2</sup> )	380.7	.....	.....	59.6	.....	.....
Wages.....	23,587,692	6,750,986	4,508,597	4,032,310	2,590,954	\$909,951	\$361,778	249.4	49.7	12.1	57.1	104.0	168.1
Paid for contract work.....	146,531	847	.....	21,001	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>1</sup> )	.....	.....	.....	.....	.....
Rent and taxes.....	6,999,154	232,439	( <sup>2</sup> )	2,942,030	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>1</sup> )	.....	.....	.....	.....	.....
Cost of materials.....	38,101,602	10,276,575	15,451,929	10,600,929	7,436,748	2,759,782	1,223,452	134.1	5.3	45.8	42.5	169.5	125.6
Value of products.....	88,038,223	30,840,472	26,053,005	19,930,821	13,027,635	6,538,959	1,904,960	185.5	18.4	30.7	53.0	99.2	243.3
Value added by manufacture <sup>4</sup> .....	49,936,621	14,563,897	10,601,136	9,329,592	5,590,887	3,779,177	681,514	242.9	37.4	13.6	66.9	47.9	454.5

<sup>1</sup> Percentages are omitted where base is less than 100 or where comparable figures can not be given.  
<sup>2</sup> Figures not available.

<sup>3</sup> Exclusive of internal revenue.  
<sup>4</sup> Value of products less cost of materials.

TABLE 4.—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.			STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
		Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.			Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.
United States.....	42	22,816	100.0	...	\$88,028	100.0	...	\$49,937	100.0	...	New Jersey.....	5	979	4.3	5	\$3,946	4.5	5	\$2,002	4.0	6
Connecticut.....	3	12,489	54.7	1	39,987	45.4	1	24,063	48.2	1	Pennsylvania.....	10	669	2.9	8	3,394	3.9	7	1,303	2.7	9
Massachusetts.....	6	2,449	10.7	3	5,961	6.8	3	4,794	9.6	3	California.....	3	298	1.3	9	1,767	2.0	10	753	1.5	10
											All other states.....	15	5,932	26.0	...	32,973	37.5	...	16,962	33.9	...

TABLE 5.—PERSONS ENGAGED IN THE INDUSTRY: 1919 AND 1914.

CLASS.	Cen-sus year.	Total.	Male.	Fe-male.	PER CENT OF TOTAL.		CLASS.	Cen-sus year.	Total.	Male.	Fe-male.	PER CENT OF TOTAL.	
					Male.	Fe-male.						Male.	Fe-male.
All classes.....	1919	27,471	18,594	8,877	67.7	32.3	Clerks and other subordinatesalaried employees.	1919	3,535	1,854	1,681	52.4	47.6
	1914	12,715	( <sup>1</sup> )	( <sup>1</sup> )	.....	.....		1914	955	701	254	73.4	26.6
Proprietors and officials.....	1919	1,120	1,105	15	98.7	1.3	Wage earners (average number).....	1919	22,816	15,635	7,181	68.5	31.5
	1914	267	261	6	97.8	2.2		1914	11,493	( <sup>1</sup> )	( <sup>1</sup> )	.....	.....
Proprietors and firm members.....	1919	10	7	3	70.0	30.0	16 years of age and over.....	1919	22,674	15,548	7,126	68.6	31.4
	1914	16	( <sup>1</sup> )	( <sup>1</sup> )	.....	.....							
Salaried officers of corporations.....	1919	103	101	2	98.1	1.9	Under 16 years of age.....	1919	142	87	55	61.3	38.7
	1914	38	( <sup>1</sup> )	( <sup>1</sup> )	.....	.....							
Superintendents and managers.....	1919	1,007	997	10	99.0	1.0							
	1914	213	( <sup>1</sup> )	( <sup>1</sup> )	.....	.....							

<sup>1</sup> Figures not available.

## MANUFACTURES.

TABLE 6.—WAGE EARNERS, BY MONTHS, FOR STATES: 1919.

[The month of maximum employment is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
United States:														
1919.....	22,816	46,771	33,327	25,065	20,438	19,113	18,369	18,768	17,285	<i>17,121</i>	17,713	18,795	19,629	36.6
Males.....	15,635	31,553	21,844	17,022	13,717	13,283	13,325	13,396	12,032	<i>11,894</i>	12,250	13,032	13,672	37.7
Females.....	7,181	15,218	11,483	8,043	6,719	5,830	5,044	5,372	5,253	<i>5,227</i>	5,463	5,763	5,957	34.3
1914.....	11,493	10,826	10,768	10,934	10,886	10,814	10,936	10,820	<i>10,008</i>	11,366	12,565	13,422	14,577	68.6
California.....	293	307	325	308	283	<i>240</i>	266	285	299	290	308	332	333	72.1
Connecticut.....	12,489	15,816	13,695	13,516	12,555	11,912	11,670	11,518	<i>10,869</i>	11,048	11,557	12,531	13,181	68.7
Massachusetts.....	2,449	9,111	4,308	2,316	1,905	1,665	1,617	1,463	1,406	1,441	1,418	<i>1,383</i>	1,325	14.5
New Jersey.....	979	2,134	1,880	1,748	995	625	624	<i>622</i>	623	623	625	624	625	20.1
Pennsylvania.....	669	2,919	895	697	523	405	<i>323</i>	339	353	380	422	434	423	11.1
States showing large proportion of females.														
Connecticut.....	3,810	4,554	4,420	4,583	4,154	3,697	3,486	3,343	<i>3,194</i>	3,237	3,417	3,747	3,888	Per ct. av. is of state.
Massachusetts.....	1,553	5,744	2,830	1,448	1,190	1,049	1,023	934	897	915	918	848	840	30.5
New Jersey.....	185	549	476	460	90	82	82	83	84	80	81	80	82	63.4
Pennsylvania.....	192	266	234	218	182	143	<i>110</i>	128	147	180	217	233	240	18.9
														28.7

TABLE 7.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR STATES: 1919.

STATE.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—						STATE.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—					
		44 and under.	Between 44 and 48.	48.1	Between 48 and 54.	54.	Between 54 and 60.			44 and under.	Between 44 and 48.	48.1	Between 48 and 54.	54.	Between 54 and 60.
United States ..1919..	22,816	1,027	3,975	5,785	9,023	1,808	935	Massachusetts.....	2,449	.....	.....	2,304	110	.....	35
1914..	11,493	(2)	(2)	195	287	1,879	8,013	New Jersey.....	979	856	.....	123	.....	.....	.....
California.....	293	163	.....	135	.....	.....	.....	Pennsylvania.....	669	8	.....	262	182	187	.....
Connecticut.....	12,489	.....	3,975	.....	8,045	409	.....								

<sup>1</sup> Includes 48 and under for 1914 and 1909.<sup>2</sup> Corresponding figures not available.

TABLE 8.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR STATES: 1919.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—																
	Establishments.	Wage earners (average number).	No wage earners.	1 to 5 wage earners, inclusive.		6 to 20 wage earners, inclusive.		21 to 50 wage earners, inclusive.		51 to 100 wage earners, inclusive.		101 to 250 wage earners, inclusive.		251 to 500 wage earners, inclusive.		501 to 1,000 wage earners, inclusive.		Over 1,000 wage earners.	
				Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.
United States....1919..	42	22,816	1	2	9	8	77	9	289	4	281	8	1,262	3	1,084	2	1,530	5	18,284
1914..	32	11,493	1	3	8	5	61	5	104	6	396	7	1,105	1	491	2	1,193	2	8,076
California.....	3	298	.....	.....	.....	.....	.....	1	23	.....	.....	2	270	.....	.....	.....	.....	.....	.....
Connecticut.....	3	12,489	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts.....	6	2,449	.....	.....	.....	.....	2	15	2	57	1	73	.....	1	469	.....	.....	.....	.....
New Jersey.....	5	979	.....	1	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania.....	10	669	1	1	4	2	23	1	28	3	208	2	359	2	615	.....	.....	.....	.....

TABLE 9.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919 AND 1914.

VALUE OF PRODUCT.	NUMBER OF ESTABLISHMENTS.		AVERAGE NUMBER OF WAGE EARNERS.		VALUE OF PRODUCTS.		VALUE ADDED BY MANUFACTURE.	
	1919	1914	1919	1914	1919	1914	1919	1914
All classes.....	42	32	22,816	11,493	\$88,038,223	\$30,840,472	\$49,036,621	\$14,563,897
\$5,000 to \$20,000.....	4	16	17	141	32,462	152,981	19,873	133,470
\$20,000 to \$100,000.....	9	7	215	245	478,400	301,377	223,611	160,535
\$100,000 to \$500,000.....	8	10	290	1,039	1,514,204	3,017,148	885,920	2,437,289
\$500,000 to \$1,000,000.....	11	5	1,691	9,268	8,201,957	3,042,442	3,851,366	11,932,553
\$1,000,000 and over.....	10	4	20,603	9,268	77,811,194	24,336,524	44,956,061	11,932,553
PER CENT DISTRIBUTION.								
All classes.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
\$5,000 to \$20,000.....	9.5	18.8	0.1	0.4	( <sup>2</sup> )	0.2	( <sup>2</sup> )	0.2
\$20,000 to \$100,000.....	21.4	21.9	0.9	2.1	0.6	1.3	0.5	1.1
\$100,000 to \$500,000.....	18.1	31.2	1.3	18.9	1.7	9.8	1.8	16.7
\$500,000 to \$1,000,000.....	26.2	15.6	7.4	90.3	9.3	9.9	7.7	82.0
\$1,000,000 and over.....	23.8	12.5	90.3	80.6	88.4	78.9	90.0	82.0

<sup>1</sup> Includes the group "Less than \$5,000."<sup>2</sup> Less than one-tenth of 1 per cent.

TABLE 10.—CHARACTER OF OWNERSHIP: 1919 AND 1914.

CHARACTER OF OWNERSHIP.	Cen- sus year.	Num- ber of estab- lish- ments.	Average number of wage earners.	Value of products.	Value added by manufac- ture.	CHARACTER OF OWNERSHIP.	Cen- sus year.	Num- ber of estab- lish- ments.	Average number of wage earners.	Value of products.	Value added by manufac- ture.
All classes.....	1919 1914	42 32	22,816 11,493	\$88,038,223 30,840,472	\$49,036,621 14,563,897	Per cent distribution: Individual.....	1919 1914	9.4 1.2	0.4 0.5	0.4 0.5	0.5 0.8
Individual.....	1919 1914	3 138	126,568 68,621	87,895,531 30,535,060	49,860,584 14,387,003	Corporation.....	1919 1914	90.5 97.8	99.5 97.8	99.8 99.0	99.8 98.8
Corporation.....	1919 1914	38 24	22,698 11,244	87,895,531 30,535,060	49,860,584 14,387,003	All other.....	1919 1914	9.5 15.6	0.5 1.0	0.2 0.6	0.2 0.7
All other.....	1919 1914	4 5	118 111	142,662 178,248	76,037 107,373						

TABLE 11.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919 AND 1914.

POWER.	NUMBER OF EN- GINES OR MOTORS.		HORSEPOWER.				POWER.	NUMBER OF EN- GINES OR MOTORS.		HORSEPOWER.			
			Amount.		Per cent dis- tribution.					Amount.		Per cent dis- tribution.	
	1919	1914	1919	1914	1919	1914		1919	1914	1919	1914	1919	1914
Primary power, total.....	1,858	238	39,128	11,354	100.0	100.0	Rented, electric.....	1,764	155	17,586	918	44.9	8.1
Owned.....	94	83	21,542	10,436	55.1	91.9	Electric.....	3,641	893	33,559	12,608	100.0	100.0
Steam.....	80	62	19,100	7,149	49.0	63.0	Rented.....	1,764	155	17,586	918	52.4	7.2
Engines.....	59	(1)	6,900	(1)	17.9	.....	Generated by establishments re- porting.....	1,877	738	15,973	11,780	47.6	82.8
Turbines.....	21	(1)	12,170	(1)	31.1	.....							
Internal-combustion engines.....	11	17	2,241	3,135	5.7	27.6							
Water wheels and turbines.....	3	4	141	152	0.4	1.3							

<sup>1</sup> Figures not available.

TABLE 12.—FUEL CONSUMED, BY STATES: 1919.

STATE.	COAL.		Coke (tons, 2,000 pounds).	Fuel oils (bar- rels).	Gas- oline and other vola- tile oils (bar- rels).	Gas (1,000 cubic feet).	STATE.	COAL.		Coke (tons, 2,000 pounds).	Fuel oils (bar- rels).	Gas- oline and other vola- tile oils (bar- rels).	Gas (1,000 cubic feet).
	Anthra- cite (tons, 2,240 pounds).	Bitumi- nous (tons, 2,000 pounds).						Anthra- cite (tons, 2,240 pounds).	Bitumi- nous (tons, 2,000 pounds).				
United States.....1919..	23,112	184,863	3,146	137,378	2,475	79,424	Massachusetts.....	6,673	14,989	842	4,914	.....	45
.....1914..	12,946	87,972	2,957	11,203	( <sup>1</sup> )	20,193	New Jersey.....	6,100	1,526	267	.....	.....	678
California.....	.....	.....	.....	6,653	22	.....	Pennsylvania.....	218	47,087	1,379	7,092	102	51,992
Connecticut.....	16,351	84,558	1,500	117,877	2,000	21,000	All other states.....	443	.....	.....	.....	351	5,709

<sup>1</sup> Included in figures for fuel oils.

## MANUFACTURES.

## SPECIAL STATISTICS.

Products, detailed statistics.—Table 13 presents the statistics for products in 1919 for the 42 commercial establishments engaged primarily in the manufacture of ammunition and also for ammunition produced as a subsidiary product by establishments engaged primarily in other lines of manufacture. This and the following table cover the total production of ammunition by all establishments, whether as a primary or a subsidiary product. Many of them manufacture firearms, ordnance, and other products that fall under other industrial classifications. This variety arises in part from the fact that many of the establishments now producing ammunition were engaged before the war in the manufacture of firearms, ordnance, and articles of a nonmilitary nature, and hence the establishments being classified according to the product of chief value, include a considerable production of firearms, ordnance products, and products not affiliated with ammunition. In like manner there was a large production of ammunition by establishments assigned to the firearms, ordnance, and other industries, among which are steel works and rolling mills, manufactures of brass, bronze, and copper products, electrical machinery, etc. Of the total output of the ammunition industry in 1919 as defined by the Bureau of the Census, 13.4 per cent consisted of

firearms and ordnance, which are accounted for in the sections on firearms and ordnance and accessories, in the same manner as the ammunition manufactured by establishments in these industries is here included in order to assemble the statistics for all ammunition. The table includes some products which are not ammunition strictly speaking, though somewhat allied thereto, for instance, railroad torpedoes.

A number of establishments engaged normally in other lines of manufacture were diverted to the war industries, and especially to the production of ammunition, and had not returned to their normal base in 1919. More than 70 per cent of the artillery ammunition that was manufactured in 1919 was produced by establishments engaged primarily in other lines of manufacture, and of the item "shot and shell, other than for small arms," amounting to \$46,287,326 included under artillery "Ammunition," 81.1 per cent were manufactured as subsidiary products by establishments outside of the industry.

Products, by geographic divisions.—Table 14 shows the distribution of the production of ammunition, by geographic divisions, so far as it can be given without disclosing the operations of individual establishments. The table shows a marked concentration of the industry, especially in New England.

TABLE 13.—PRODUCTS, DETAILED STATISTICS: 1919.

KIND.	Value.	KIND.	Value.
Total value.....	\$143,677,869	Ammunition and allied products—Continued.	
The ammunition industry, all products.....	88,038,223	Percussion caps.....	\$676,081
Subsidiary ammunition products of other industries.....	55,639,646	Primers.....	403,165
Ammunition and allied products <sup>1</sup> .....	122,457,859	Shot (8,836 tons, value \$1,364,630; for balance, \$1,396,669, quantity not reported).....	2,761,209
Artillery ammunition <sup>2</sup> .....	53,416,393	Wads.....	630,725
Ammunition for small arms.....	39,550,789	Blasting and detonating caps.....	2,630,365
Paper shells.....	16,935,149	Detonating fuses.....	3,839,517
Loaded.....	9,979,455	Safety fuses.....	3,322,105
Unloaded.....	4,809,196	Other fuses and naval torpedoes.....	9,648,531
Not specified.....	2,146,493	Railroad torpedoes.....	4,288,422
Metals shells, loaded and unloaded.....	1,717,371	Contract settlements.....	3,854,482
Cartridges.....	16,426,990	Miscellaneous allied products, not classified.....	2,407,295
Revolver.....	7,223,652	Firearms, products of ammunition establishments.....	6,604,803
Rifle.....	7,223,174	Ordnance, products of ammunition establishments.....	6,228,152
Not specified.....	1,965,173	All other products, other than ammunition or allied products.....	9,387,055

<sup>1</sup> Not including products of 5 governmental establishments, \$15,908,181.

<sup>2</sup> Includes shot and shell other than for small arms \$46,287,326, of which quantity was reported for \$6,322,485, viz, 12,560 tons; for balance, quantity not reported.

TABLE 14.—NUMBER OF ESTABLISHMENTS AND VALUE OF PRODUCTS, BY GEOGRAPHIC DIVISIONS: 1919.

PRODUCT AND DIVISION.	Number of establishments.	Value.	PRODUCT AND DIVISION.	Number of establishments.	Value.
Ammunition and allied products.....		\$122,457,859	Ammunition and allied products—Continued.		
Ammunition for artillery.....	30	53,416,393	Paper shells, unloaded (New England, 3; other, 1).....	4	\$4,809,196
New England (Connecticut, 3; Massachusetts, 4; other, 2).....	9	11,159,690	Blasting and detonating caps (North Atlantic, 3; other, 2).....	5	2,630,365
Middle Atlantic (Pennsylvania, 12; other, 3).....	15	19,339,969	Railroad torpedoes.....	8	4,288,422
East North Central (Indiana, 4; Ohio, 4; other, 2).....	10	3,181,237	New England.....	3	3,501,757
Other divisions.....	5	19,735,497	Middle Atlantic (Pennsylvania, 4; other, 1).....	5	786,666
Rifle cartridges.....	6	7,233,174	Primers (New England, 3; other, 2).....	5	403,165
New England.....	3	6,704,444	Miscellaneous, distributed.....	20	21,725,217
Other divisions.....	3	528,730	New England (Massachusetts, 6; Connecticut, 3).....	9	7,901,580
Revolver cartridges.....	6	7,223,652	Middle Atlantic (Pennsylvania, 6; other, 2).....	8	10,748,071
New England.....	3	6,390,034	East North Central.....	0	2,104,959
Other divisions.....	3	838,618	Other divisions.....	3	970,637
			Miscellaneous, not distributed.....		20,723,275

<sup>1</sup> Includes chiefly detonating, safety, and other fuses, naval torpedoes, and contract settlements.

## GENERAL TABLE.

Detailed statement, by states.—Table 15 presents for | and for each state that can be shown without the dis-  
1919 the statistics in detail for the industry as a whole | closure of individual operations.

TABLE 15.—DETAILED STATEMENT, BY STATES: 1919.

STATE.	Number of establishments	PERSONS ENGAGED IN THE INDUSTRY.								WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.						EXPENSES.	
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks, etc.		Wage earners.			Total.	16 and over.		Under 16.		Capital.	Salaries and wages.	
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.	Female.		Officials.	Clerks, etc.
								Maximum month.	Minimum month.								
United States.....	42	27,471	10	1,110	1,854	1,681	22,816	Ja 46,771	Se 17,121	22,709	16,333	6,237	91	48	\$94,558,043	\$4,277,331	\$3,329,820
California.....	3	343	.....	17	19	9	298	De 333	My 240	290	150	146	.....	.....	3,072,442	57,291	30,838
Connecticut.....	3	15,385	.....	595	1,103	1,198	12,489	Ja 15,816	Aug 10,869	13,181	9,243	3,851	50	37	44,189,578	2,169,609	1,716,803
Massachusetts.....	6	2,663	.....	30	73	111	2,449	Ja 9,111	No 1,323	1,778	707	971	30	10	7,128,069	125,780	197,189
New Jersey.....	5	1,280	.....	54	142	105	979	Ja 2,134	Jy 622	1,056	942	110	3	1	6,898,164	198,700	288,832
New York.....	3	444	.....	32	80	68	264	Ja 1,771	Se 85	1,724	1,551	173	.....	.....	2,874,797	100,780	84,207
Pennsylvania.....	10	904	7	138	71	19	609	Ja 2,919	Je 323	1,033	771	262	.....	.....	6,105,657	305,449	120,176
All other states <sup>1</sup> .....	12	6,452	3	244	366	171	5,668	.....	.....	3,641	2,909	724	8	.....	24,289,936	1,250,626	891,775

STATE.	EXPENSES—continued.						Value of products.	Value added by manufacture.	POWER.						
	Salaries and wages—Con.	For contract work.	Rent and taxes.		For materials.				Primary horsepower.					Electric horsepower generated in establishments reporting.	
			Rent of factory.	Taxes Federal, state, county, and local.	Principal materials.	Fuel and rent of power.			Total.	Owned.					
										Steam engines (not turbines).	Steam turbines.	Internal-combustion engines.	Water power. <sup>2</sup>	Rent. <sup>3</sup>	
United States.....	\$23,587,602	\$146,531	\$9,545	\$8,989,609	\$36,548,100	\$1,553,442	\$88,038,223	\$49,936,621	39,128	6,990	12,170	2,241	141	17,586	15,973
California.....	223,946	.....	.....	193,990	995,260	18,940	1,767,321	753,121	626	20	.....	31	.....	575	.....
Connecticut.....	12,253,790	.....	.....	2,001,563	15,073,855	859,866	39,996,945	24,063,224	21,542	3,530	10,170	2,085	96	5,601	12,552
Massachusetts.....	2,403,567	.....	738	1,092,037	1,050,372	117,036	5,961,390	4,793,982	2,604	50	.....	.....	.....	2,644	.....
New Jersey.....	969,031	.....	.....	202,383	1,852,362	92,320	3,946,431	2,001,749	3,843	700	2,000	.....	.....	1,143	1,260
New York.....	358,426	22,517	6,012	362,486	462,132	37,059	1,903,610	1,404,410	1,580	900	.....	.....	.....	680	55
Pennsylvania.....	618,030	124,014	2,795	228,843	1,964,408	65,816	3,393,738	1,303,424	2,600	.....	.....	.....	.....	2,600	.....
All other states <sup>1</sup> .....	6,760,902	.....	.....	2,808,247	15,149,681	362,405	31,068,788	15,556,702	6,243	1,790	.....	125	45	4,283	2,106

<sup>1</sup> All other states embrace: Colorado, 1 establishment; Illinois, 1; Indiana, 2; Maryland, 1; Michigan, 1; Minnesota, 2; Ohio, 3; and Rhode Island, 1.

<sup>2</sup> Includes water wheels and turbines (irrespective of ownership of water supply), and water motors (operated by water from city mains).

<sup>3</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-holt or transmitted power from neighboring power plants).



# FIREARMS.

## GENERAL STATISTICS.

**General character of the industry.**—The following report on the firearms industry covers the commercial manufacture of portable firearms—that is, those that can be fired from the shoulder—together with their parts and accessories, bayonets and scabbards. Machine guns, properly speaking, being mounted, find their place in the report on ordnance.

Statistics for establishments operated by the Federal Government are not included in this report but are given in the introductory section for the combined industries—ammunition, firearms, and ordnance. Prior to the present census, detailed statistics of products were not reported; there was no special schedule and the establishments reported only the total value of products.

**Comparative summary.**—Table 16 summarizes the statistics for the censuses from 1879 to 1919, inclusive, with percentages of increase. The general statistics for the industry at earlier censuses are as follows: In 1869 the industry was represented by 46 establishments, with 3,297 wage earners (average number) and products valued at \$5,582,258; in 1859 by 242 establishments, with 2,065 wage earners and products valued at \$2,368,931; and in 1849 by 317 establishments, 1,547 wage earners, and products valued at \$1,173,014.

**Principal states, ranked by value of products.**—Statistics by states can only be presented for Connecticut, New York, and Massachusetts. Table 17 shows these states ranked in the order named with respect to value of products, wage earners, and value added by manufacture.

**Persons engaged in the industry.**—The age classification of the average number of wage earners in Table 18 is an estimate obtained by the method described in the "Explanation of terms." Figures for states will be found in Table 27.

**Wage earners, by months.**—The statistics presented in Table 19 are intended to show the steadiness of employment, or the reverse, in accordance with the industrial conditions existing during 1919. Of the total average number of wage earners employed in the industry, 9.9 per cent were females. New York with 553 females shows the highest ratio, 13.7 per cent.

**Average number of wage earners, by prevailing hours of labor per week.**—The statistics in Table 20 show in a marked degree the reduction in the prevailing hours of labor in 1919 as compared with 1914. In 1914 practically all of the wage earners were em-

ployed in establishments where the prevailing hours of labor were 54 or more per week, whereas in 1919 the wage earners employed "54" hours per week and more constituted but 17 per cent of the total number, and 79.2 per cent were employed in establishments where the hours were "48" per week or less.

**Size of establishments, by average number of wage earners.**—The industry is one of large units. In 1919, 13 establishments employed over 100 wage earners each, and represented 96.5 per cent of the total number employed in all establishments. Table 21 shows that the group "Over 1,000 wage earners" carries the largest number of wage earners, the number employed representing 54.4 per cent of all wage earners in 1919, compared with 34.3 per cent in 1914.

**Size of establishments, by value of products.**—The natural increase in the firearms industry, due to the World War, together with the inflation of values, has resulted in a marked shift to the group of establishments with products valued at "\$1,000,000 and over" in 1919 as compared with 1914 as presented in Table 22. In 1919 the average value of products per establishment was \$1,160,822 as compared with \$363,578 in 1914.

**Character of ownership.**—Table 23 shows that the industry is mainly in the hands of corporations. In 1919, 4 individual establishments with 44 wage earners reported products valued at \$78,618, or three-tenths of 1 per cent of the value of all products for the industry, and 3 firms with 714 wage earners reported products to the value of \$1,662,283, or 5.5 per cent of the value of all products for the industry, the balance being corporations. In 1914 there were 8 individual establishments with 665 wage earners and products valued at \$1,184,920, and 3 establishments owned by firms with 580 wage earners and products valued at \$1,013,180.

**Number and horsepower of types of prime movers.**—The total horsepower presented in Table 24 for 1919 as compared with that for 1914 shows an increase of 18,693, or 250.1 per cent. Electric power is an important factor, and in 1919 purchased electric power constituted 45.1 per cent of the total primary power, and in 1914, 54 per cent. A large proportion of the owned power is employed in electric generation.

**Fuel consumed, by states.**—Table 25 shows the total quantities of the principal kinds of fuel used for the industry as a whole, and the distribution of same, by states.

TABLE 16.—COMPARATIVE SUMMARY: 1919, 1914, 1909, 1904, 1899, 1889, AND 1879.

	1919	1914	1909	1904	1899	1889	1879	PER CENT OF INCREASE. <sup>1</sup>					
								1914-1919	1909-1914	1904-1909	1899-1904	1889-1899	1879-1889
Number of establishments.....	20	20	27	30	32	34	39	.....	.....	.....	.....	.....	.....
Persons engaged.....	12,534	7,518	6,436	6,563	4,710	(?)	(?)	66.7	.....	.....	30.3	.....	.....
Proprietors and firm members.....	9	16	15	339	228	(?)	(?)	182.6	.....	.....	48.7	.....	.....
Salaried employees.....	1,238	438	419	6,224	4,482	2,660	4,862	59.8	17.7	-3.0	38.9	68.5	-45.3
Wage earners (average number).....	11,287	7,064	6,002	6,224	4,482	2,660	4,862	59.8	17.7	-3.0	38.9	68.5	-45.3
Primary horsepower.....	26,167	7,474	7,523	16,352	4,490	(?)	(?)	250.1	-0.7	-54.0	264.2	.....	.....
Capital.....	\$51,917,782	\$15,610,809	\$13,033,000	\$10,376,264	\$9,016,231	(?)	(?)	232.6	19.8	25.6	50.0	.....	.....
Salaries and wages.....	15,427,678	5,776,500	4,447,322	4,231,190	2,785,572	(?)	(?)	167.1	.....	.....	51.9	.....	.....
Salaries.....	2,094,183	708,447	528,670	508,340	243,206	(?)	(?)	195.2	.....	.....	100.0	.....	.....
Wages.....	13,333,495	5,068,053	3,918,652	3,722,850	2,542,366	\$1,575,361	\$2,700,281	163.1	20.3	5.3	46.4	61.3	-41.6
Paid for contract work.....	.....	.....	480	43,494	(?)	(?)	(?)	.....	.....	.....	.....	.....	.....
Rent and taxes.....	1,388,410	109,733	79,124	\$1,085,183	(?)	(?)	(?)	1,165.3	.....	.....	.....	.....	.....
Cost of materials.....	7,613,784	2,689,618	1,568,734	1,738,012	1,305,421	485,946	1,850,026	185.2	70.2	-9.7	33.1	108.6	-73.9
Value of products.....	30,181,370	10,543,753	8,058,490	8,275,660	5,444,659	2,922,514	5,736,936	186.2	30.8	-2.6	52.0	86.3	-49.1
Value added by manufacture.....	22,567,586	7,874,136	6,489,765	6,537,548	4,130,238	2,436,568	3,877,910	186.6	21.3	-0.7	57.9	69.9	-37.2

<sup>1</sup> A minus sign (-) denotes decrease; percentages are omitted where base is less than 100 or where comparable figures can not be given.  
<sup>2</sup> Figures not available. <sup>3</sup> Exclusive of internal revenue. <sup>4</sup> Value of products less cost of materials.

TABLE 17.—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.			STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
		Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.			Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.
United States.....	26	11,287	100.0	...	\$30,181	100.0	...	\$22,568	100.0	...	Massachusetts.....	5	2,253	20.0	3	\$5,045	18.7	3	\$4,578	20.3	1
Connecticut.....	9	4,561	40.4	1	15,929	52.8	1	11,631	51.5	1	All other states.....	5	424	3.8	...	426	1.4	...	209	0.9	...
New York.....	7	4,049	35.9	2	8,181	27.1	2	6,150	27.3	2											

TABLE 18.—PERSONS ENGAGED IN THE INDUSTRY: 1919 AND 1914.

CLASS.	Cen-sus year.	Total.	Male.	Fe-male.	PER CENT OF TOTAL.		CLASS.	Cen-sus year.	Total.	Male.	Fe-male.	PER CENT OF TOTAL.	
					Male.	Fe-male.						Male.	Fe-male.
All classes.....	1919	12,534	10,950	1,584	87.4	12.6	Clerks and other subordinate salaried employees.....	1919	1,043	577	466	55.3	44.7
	1914	7,518	(?)	(?)	(?)	(?)		1914	325	198	127	60.9	39.1
Proprietors and officials.....	1919	204	202	2	99.0	1.0	Wage earners (average number).....	1919	11,287	10,171	1,116	90.1	9.9
	1914	128	126	2	97.7	2.3		1914	7,064	(?)	(?)	.....	.....
Proprietors and firm members.....	1919	9	8	1	88.9	11.1	16 years of age and over.....	1919	11,230	10,123	1,107	90.1	9.9
	1914	16	(?)	(?)	.....	.....	Under 16 years of age.....	1919	48	48	.....	.....	.....
Salaried officers of corporations.....	1919	38	38	.....	100.0	.....							
	1914	34	(?)	(?)	.....	.....							
Superintendents and managers....	1919	157	156	1	99.4	0.6							
	1914	79	(?)	(?)	.....	.....							

<sup>1</sup> Figures not available.

TABLE 19.—WAGE EARNERS, BY MONTHS, FOR STATES: 1919.

[The month of maximum employment is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		Janu-ary.	Febru-ary.	March.	April.	May.	June.	July.	August.	Sep-tember.	Octo-ber.	Novem-ber.	Decem-ber.	
United States:														
1919.....	11,287	<b>13,428</b>	12,369	11,606	11,022	10,885	10,545	<i>10,194</i>	10,683	10,926	11,284	11,251	11,251	75.9
Males.....	10,171	<b>11,808</b>	10,966	10,362	9,878	9,828	9,602	<i>9,239</i>	9,696	9,940	10,273	10,237	10,225	78.3
Females.....	1,116	<b>1,622</b>	1,403	1,244	1,144	1,057	943	<i>955</i>	987	986	1,011	1,014	1,026	58.1
1914.....	7,064	<b>7,401</b>	7,437	7,443	7,343	7,227	7,018	<i>6,816</i>	<b>6,748</b>	6,926	6,879	6,987	7,649	76.1
Connecticut.....	4,561	<b>8,075</b>	5,681	4,940	4,504	4,369	3,827	<i>3,652</i>	<b>3,615</b>	3,821	4,153	4,129	3,957	44.8
Massachusetts.....	2,253	<b>1,388</b>	1,764	2,124	2,385	2,498	2,370	<i>2,312</i>	<b>2,351</b>	2,363	2,397	2,435	2,451	53.9
New York.....	4,049	<b>3,368</b>	4,431	4,081	3,746	3,638	3,801	<i>3,871</i>	<b>4,305</b>	4,327	4,299	4,278	4,443	75.8

## MANUFACTURES.

TABLE 20.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR STATES: 1919.

STATE.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—							STATE.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—						
		44 and under.	Between 44 and 48.	48.	Between 48 and 54.	54.	Between 54 and 60.	60.			44 and under.	Between 44 and 48.	48.	Between 48 and 54.	54.	Between 54 and 60.	60.
United States..1919..	11,287	282	3,080	5,576	434	932	961	22	Massachusetts.....	2,253	1	.....	691	.....	712	849	.....
1914..	7,064	.....	.....	.....	4	2,001	4,032	1,027	New York.....	4,049	10	1,992	1,659	204	184	.....	.....
Connecticut.....	4,561	.....	1,088	3,131	192	36	112	2									

TABLE 21.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR STATES: 1919.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—											
	Establishments.	Wage earners (average number).	No wage earners.		1 to 5 wage earners, inclusive.		6 to 20 wage earners, inclusive.		21 to 50 wage earners, inclusive.		51 to 100 wage earners, inclusive.		101 to 250 wage earners, inclusive.	
			Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.
United States.....1919..	26	11,287	1	3	7	3	44	4	146	2	194	3	580	5
1914..	29	7,064	2	4	10	5	73	3	108	1	63	4	674	2,059
Connecticut.....	9	4,561	.....	1	1	1	14	3	108	1	99	1	192	.....
Massachusetts.....	5	2,253	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
New York.....	7	4,049	1	.....	.....	1	10	.....	.....	.....	2	388	1	316

TABLE 22.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919 AND 1914.

VALUE OF PRODUCT.	NUMBER OF ESTABLISHMENTS.		AVERAGE NUMBER OF WAGE EARNERS.		VALUE OF PRODUCTS.		VALUE ADDED BY MANUFACTURE.	
	1919	1914	1919	1914	1919	1914	1919	1914
All classes.....	26	29	11,287	7,064	\$30,181,370	\$10,543,753	\$22,567,586	\$7,874,135
Less than \$5,000.....	4	5	8	6	10,109	12,980	8,506	10,478
\$5,000 to \$20,000.....	.....	5	.....	60	.....	66,978	.....	47,769
\$20,000 to \$100,000.....	6	5	154	188	353,777	322,762	260,472	184,614
\$100,000 to \$1,000,000.....	9	11	1,924	3,762	3,559,799	5,261,291	2,668,026	4,161,792
\$1,000,000 and over.....	7	3	9,201	3,048	26,257,685	4,879,742	19,629,682	3,460,482
PER CENT DISTRIBUTION.								
All classes.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than \$5,000.....	15.4	17.2	0.1	0.1	(1)	0.1	(1)	0.1
\$5,000 to \$20,000.....	.....	17.2	.....	0.8	.....	0.6	.....	0.6
\$20,000 to \$100,000.....	23.1	17.2	1.4	2.7	1.2	3.1	1.2	2.3
\$100,000 to \$1,000,000.....	34.0	37.9	17.0	53.3	11.8	49.9	11.8	52.9
\$1,000,000 and over.....	26.9	10.4	81.5	43.1	87.0	46.3	87.0	44.1

1 Less than one-tenth of 1 per cent.

TABLE 23.—CHARACTER OF OWNERSHIP: 1919 AND 1914.

CHARACTER OF OWNERSHIP.	Cen- sus year.	Num- ber of estab- lish- ments	Aver- age num- ber of wage earn- ers.	Value of products.	Value added by manufac- ture.	CHARACTER OF OWNERSHIP.	Cen- sus year.	Num- ber of estab- lish- ments	Aver- age num- ber of wage earn- ers.	Value of products.	Value added by manufac- ture.
All classes.....	1919 1914	26 29	11,287 7,064	\$30,181,370 10,543,753	\$22,567,586 7,874,135	Percent distribution: Individual.....	1919 1914	15.4 27.6	0.4 9.4	0.3 11.2	0.3 10.2
Individual.....	1919 1914	4 8	44 665	78,618 1,184,920	58,140 804,250	Corporation.....	1919 1914	73.1 62.1	93.3 82.4	94.2 79.2	93.6 78.8
Corporation.....	1919 1914	19 18	10,529 5,819	23,440,469 8,345,653	21,106,032 6,207,072	All other.....	1919 1914	11.5 10.3	6.3 8.2	5.5 9.6	6.2 11.0
All other.....	1919 1914	3 3	714 580	1,662,283 1,013,180	1,403,414 862,813						

TABLE 24.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919 AND 1914.

POWER.	NUMBER OF ENGINES OR MOTORS.		HORSEPOWER.				POWER.	NUMBER OF ENGINES OR MOTORS.		HORSEPOWER.			
	1919	1914	Amount.		Per cent distribution.			1919	1914	Amount.		Per cent distribution.	
			1919	1914	1919	1914				1919	1914		
Primary power, total.....	860	228	26,187	7,474	100.0	100.0	Rented.....	846	200	11,813	4,133	45.1	55.3
Owned.....	14	28	14,354	3,341	54.9	44.7	Electric.....	846	200	11,813	4,033	45.1	54.0
Steam.....	12	22	14,196	3,027	54.3	40.5	Other.....				100		1.3
Engines.....	6	(1)	846	(1)	3.2		Electric.....	1,394	220	20,843	4,561	100.0	100.0
Turbines.....	6	(1)	13,350	(1)	51.0		Rented.....	846	200	11,813	4,033	50.7	88.4
Internal-combustion engines....		1		4		0.1	Generated by establishments reporting.....	548	20	9,030	538	43.3	11.6
Water wheels and turbines.....	2	5	158	310	0.6	4.1							

<sup>1</sup> Figures not available.

TABLE 25.—FUEL CONSUMED, BY STATES: 1919.

STATE.	COAL.		Fuel oils (barrels).	Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).	STATE.	COAL.		Fuel oils (barrels).	Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).
	Anthracite (tons, 2,240 pounds).	Bituminous (tons, 2,000 pounds).					Anthracite (tons, 2,240 pounds).	Bituminous (tons, 2,000 pounds).			
United States.....1919..	2,174	74,415	11,451	1,310	29,389	Massachusetts.....	30	6,440	2,113	199	997
.....1914..	1,885	21,954	2,190	(1)	9,859	New York.....	2,047	18,251	4,851	450	11,245
Connecticut.....		49,246	4,487	661	15,780	All other states.....	97	478			1,367

<sup>1</sup> Included in figures for fuel oils.

## SPECIAL STATISTICS.

The foregoing tables relating to the firearms industry give the general statistics for the 26 commercial establishments engaged primarily in the manufacture of firearms. There is a large production of firearms, however, by establishments in other lines of manufacture, especially ammunition, and Table 26 gives the total production of firearms by all establishments, whether manufactured as a primary or subsidiary product.

Products, detailed statistics.—Table 26 gives the statistics of production, both as to quantity and value, with as much detail as the reports permit. Most of the subsidiary production was reported by establishments included under the "Ammunition" industry on account of the preponderance of ammunition products. In like manner the establishments assigned

to the firearms industry reported a considerable output of products assignable to ordnance. These are included in the presentation of products for the ordnance industry. While rifles and shotguns were quite freely reported as to number, this information was not reported with as much detail for revolvers and pistols.

Production figures, by states, can not be given, but the industry is largely centralized in the New England and Middle Atlantic geographic divisions. With respect to the classified industry, the states of Connecticut, Massachusetts, and New York cover 98.6 per cent of the products. The subsidiary production of firearms included under other industries is more widely distributed but is still in the main the product of establishments located in the North Atlantic states.

TABLE 26.—PRODUCTS, DETAILED STATISTICS OF NUMBER AND VALUE: 1919.

KIND.	Number.	Value.	KIND.	Number.	Value.
Total value.....		\$37,314,086	Firearms—Continued.		
The firearms industry, all products.....		30,181,370	Carbines.....	33,811	\$578,345
Subsidiary firearms products of other industries.....		7,133,316	Shotguns.....		6,173,989
Firearms <sup>1</sup> .....		29,212,450	Repeating.....	33,423	2,466,851
Revolvers and pistols.....		12,560,901	Double barreled.....	90,158	1,803,284
Revolvers.....	234,188	2,032,392	Single barreled.....	244,142	1,497,854
Pistols, automatic.....	139,577	1,648,611	Kind not specified.....	14,000	406,000
Pistols, other than automatic.....		3,205,384	Other firearms (combination shotguns and rifles, shoulder and dart whale guns, special guns for target practice), accessories, bayonets, and scabbards and parts.....		2,004,852
Quantity reported.....	7,280	31,178	Ordnance, products of firearms establishments.....		7,401,272
Quantity not reported.....		3,174,206	Ammunition, products of firearms establishments.....		77,081
Kind not specified.....		5,674,514	Contract work.....		395,521
Rifles.....		7,894,363	All other products.....		228,362
Military and automatic.....	* 154,738	2,632,035			
Repeating.....	180,931	2,765,083			
Single.....	* 333,995	2,497,245			

<sup>1</sup> Not including products of 3 governmental establishments, \$21,264,751.<sup>2</sup> Includes estimated number (1,013) for rifles valued at \$17,320.<sup>3</sup> Includes estimated number (4,006) for rifles valued at \$30,046.

## MANUFACTURES.

## GENERAL TABLE.

Table 27 presents for 1919 the statistics in detail for | figures can be shown without disclosing the operations  
the industry as a whole and for each state for which | of individual establishments.

TABLE 27.—DETAILED STATEMENT, BY STATES: 1919.

STATE.	Number of establishments.	PERSONS ENGAGED IN THE INDUSTRY.								WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.				EXPENSES.		
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks, etc.		Wage earners.			Total.	16 and over.		Under 16.	Capital.	Salaries and wages.	
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.		Officials.	Clerks, etc.
								Maximum month.	Minimum month.							
United States.....	28	12,534	9	195	577	466	11,287	Ja 13,428	Ja 10,194	11,497	10,390	1,058	49	\$51,917,782	\$356,026	\$1,238,157
Connecticut.....	9	4,952	3	74	176	138	4,561	Ja 8,075	Ja 3,615	4,212	3,834	377	1	30,174,424	374,561	453,093
Massachusetts.....	5	2,440	1	13	78	95	2,253	Ja 2,670	Ja 1,386	2,463	2,323	95	45	5,294,048	95,542	234,363
New York.....	7	4,663	1	84	313	216	4,049	De 4,443	Ja 3,368	4,423	3,891	529	3	15,731,550	337,701	533,456
All other states <sup>1</sup> .....	5	479	4	24	10	17	424	.....	.....	399	342	57	.....	717,751	48,222	17,245

STATE.	EXPENSES—continued.					Value of products.	Value added by manufacture.	POWER.					
	Salaries and wages—Con.		Rent and taxes.		For materials.			Primary horsepower.				Electric horsepower generated in establishments reporting.	
	Wage earners.	Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.			Total.	Owned.				Rented (electric).
									Steam engines (not turbines).	Steam turbines.	Water power. <sup>2</sup>		
United States.....	\$13,333,495	\$17,896	\$1,370,514	\$6,757,191	\$356,593	\$30,181,370	\$22,507,580	26,167	846	13,350	158	11,813	9,030
Connecticut.....	6,050,283	7,017	787,604	3,854,139	443,240	15,928,706	11,631,318	15,632	76	12,750	40	2,766	9,000
Massachusetts.....	2,599,197	520	372,572	961,022	105,185	5,044,510	4,578,303	2,121	570	.....	.....	1,551	.....
New York.....	4,524,422	6,382	204,311	1,736,522	295,220	8,181,429	6,146,687	8,146	150	600	118	7,278	30
All other states <sup>1</sup> .....	159,593	3,977	6,027	205,508	12,939	426,725	208,278	268	50	.....	.....	218	.....

<sup>1</sup> All other states embrace: Illinois, 1 establishment; Michigan, 1; New Jersey, 1; and Pennsylvania, 2.  
<sup>2</sup> Includes water wheels and turbines (irrespective of ownership of water supply).

# ORDNANCE AND ACCESSORIES.

## GENERAL STATISTICS.

**General character of the industry.**—The following report pertains to the commercial establishments engaged in the manufacture of "Ordnance and accessories," and with respect to products includes all ordnance and ordnance stores in the military sense, except those covered by the other sections of this report—"Firearms," or small arms, and "Ammunition."

At the census of 1914 only two establishments were engaged primarily in the manufacture of ordnance and accessories, and they were included in the group designated as "All other industries," which included the few industries for which separate statistics could not be published. Likewise at the census of 1909 the industry was represented by but one establishment; consequently comparative figures are not available for prior years. The term ordnance is not used in the broad military sense to include infantry and cavalry equipment and shot and shell for cannon, which latter are here classed under "Ammunition," but comprises only artillery, or mounted guns, gun mounts, carriages, caissons, limbers, and mounted machine guns, with accessories. Light portable machine guns are listed as automatic rifles in the statistics relating to firearms. With "accessories" are included miscellaneous manufactures which were so reported that they can not be easily separated, among which are artillery and car axles and spindles, cases and ball-bearing parts, gun-fire control, air compressors, coolers, periscopes, sights, lifting jacks, and electrical dials.

Projectiles, bushings, and caps for projectiles will be found under "Ammunition," and there is possibly an unknown quantity of armor plate included with the gun forgings reported by steel works and rolling mills.

**Comparative summary.**—As above stated, comparable figures with respect to previous censuses can not be given, and the full statistics for 1919 will be found in Table 36. At the censuses of 1904, 1899, and 1889 the industry was designated as ordnance and ordnance stores and included supplies now classified under "Ammunition."

**Principal states, ranked by value of products.**—In Table 28 the states are ranked according to value of products, and the rank shown for average number of wage earners and value added by manufacture. The states of New York, Ohio, Pennsylvania, Michigan, Indiana, and Wisconsin, included with "All other states," rank second, fourth, fifth, sixth, seventh, and eighth, respectively.

**Persons engaged in the industry.**—The age classification of the average number of wage earners in Table 29 is an estimate obtained by the method

described in the "Explanation of terms." Figures for states will be found in Table 36.

**Wage earners, by months.**—The statistics presented in Table 30 are intended to show the steadiness of employment, or the reverse, in accordance with the industrial conditions existing in 1919. The number of females employed is relatively small, the average number for the year constituting but 2.7 per cent of the total number.

**Average number of wage earners, by prevailing hours of labor per week.**—Table 31 shows the prevalence of the short working day in this industry. The majority of the wage earners, 71.3 per cent of the total, were employed in establishments in which the prevailing hours of labor were 48 per week, and 11.4 per cent were in establishments where the hours were 44 per week or less.

**Size of establishments, by average number of wage earners.**—Table 32 shows that the industry is one of large units, the average for all establishments being 436 wage earners, and 5 establishments, each employing over 500 wage earners, account for 61.5 per cent of the total number.

**Size of establishments, by value of products.**—Of the 26 establishments, 14 had products each in excess of \$1,000,000. These employed 9,647 wage earners, or 85.2 per cent of the total number, and reported products valued at \$63,439,134, or 91.3 per cent of the total for the industry, and value added by manufacture to the amount of \$39,172,259, or 91.3 per cent of the total for the industry. Only 6 establishments reported products, valued at less than \$500,000, these having 357 wage earners, \$1,099,632 in value of products, and \$848,272 in value added by manufacture, and 6 had products of \$500,000 but less than \$1,000,000, these having 1,324 wage earners, products valued at \$4,956,862 and value added by manufacture \$2,882,439.

**Character of ownership.**—With one exception the industry is in the hands of "Corporations," this one establishment representing but a fraction of 1 per cent of the wage earners employed and the value of products.

**Number and horsepower of types of prime movers.**—Table 33 shows that electric power is an important factor in the manufacture of ordnance and accessories, and that purchased electric power constituted 78.6 per cent of the total primary power. In addition, a large proportion of the owned power was employed in generating electric power and is so utilized.

**Fuel consumed.**—Table 34 shows the quantities and different kinds of fuel used in the industry and the distribution of the same, by states. The gas reported is chiefly natural gas.

## MANUFACTURES.

TABLE 28.—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.			STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
		Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.			Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.
United States.....	26	11,328	100.0	...	\$69,496	100.0	...	\$42,903	100.0	...	Connecticut.....	4	1,443	12.7	3	\$11,697	16.8	3	\$6,361	14.8	3
Massachusetts.....	4	1,805	15.9	2	18,347	26.4	1	11,919	27.8	1	All other states.....	18	8,080	71.4	...	39,452	56.8	...	24,623	57.4	...

TABLE 29.—PERSONS ENGAGED IN THE INDUSTRY: 1919.

CLASS.	Total.	Male.	Female.	PER CENT OF TOTAL.		CLASS.	Total.	Male.	Female.	PER CENT OF TOTAL.	
				Male.	Female.					Male.	Female.
All classes.....	13,600	12,711	889	93.5	6.5	Clerks and other subordinate salaried employees.....	1,829	1,249	580	68.3	31.7
Proprietors and officials.....	443	440	3	99.3	0.7	Wage earners (average number).....	11,328	11,022	306	97.3	2.7
Proprietors and firm members.....	3	3	...	...	...	16 years of age and over.....	11,326	11,020	306	97.3	2.7
Salaried officers of corporations.....	90	90	...	...	...	Under 16 years of age.....	2	2	...	...	...
Superintendents and managers.....	350	347	3	99.1	0.9						

1 Figures not available.

TABLE 30.—WAGE EARNERS, BY MONTHS, FOR STATES: 1919.

[The month of maximum employment is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
United States.....	11,328	19,435	15,331	15,038	13,200	11,730	10,022	8,353	7,974	7,990	8,174	9,159	9,530	41.0
Males.....	11,022	18,504	14,836	14,568	12,883	11,461	9,816	8,209	7,837	7,875	8,055	9,009	9,211	42.4
Females.....	306	931	495	470	317	269	206	144	137	115	119	150	319	12.4
Connecticut.....	1,443	1,486	1,590	2,065	2,753	2,238	1,487	850	625	659	768	992	1,101	22.7
Massachusetts.....	1,805	3,937	3,393	2,736	1,777	1,516	902	1,401	1,392	1,317	935	1,075	1,279	22.9

TABLE 31.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR STATES: 1919.

STATE.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—				
		44 and under.	48.	Between 48 and 54.	Between 54 and 60.	Over 60.
United States.....	11,328	1,295	8,077	970	814	172
Connecticut.....	1,443	.....	764	.....	679	.....
Massachusetts.....	1,805	496	1,309	.....	.....	.....

TABLE 32.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR STATES: 1919.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—											
	Establishments.	Wage earners (average number).	21 to 50 wage earners, inclusive.		51 to 100 wage earners, inclusive.		101 to 250 wage earners, inclusive.		251 to 500 wage earners, inclusive.		501 to 1,000 wage earners, inclusive.		Over 1,000 wage earners.	
			Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.
United States.....	26	11,328	2	81	4	270	8	1,326	7	2,680	4	2,954	1	4,011
Connecticut.....	4	1,443					2	358	1	405	1	680		
Massachusetts.....	4	1,805							3	1,256	1	549		

TABLE 33.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919.

POWER.	Number of engines or motors.	HORSEPOWER.		POWER.	Number of engines or motors.	HORSEPOWER.	
		Amount.	Per cent distribution.			Amount.	Per cent distribution.
Primary power, total.....	1,875	40,652	100.0	Rented, electric.....	1,838	31,905	78.6
Owned.....	37	8,687	21.4	Electric.....	2,403	38,550	100.0
Steam.....	31	8,300	20.4	Rented.....	1,838	31,905	82.9
Engines.....	28	6,669	16.4	Generated by establishments reporting.....	565	6,645	17.1
Turbines.....	3	1,031	4.0				
Internal-combustion engines.....	5	187	0.5				
Water wheels and turbines.....	1	200	0.5				

TABLE 34.—FUEL CONSUMED, BY STATES: 1919.

STATE.	COAL.		Coke (tons, 2,000 pounds).	Fuel oils (barrels).	Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).	STATE.	COAL.		Coke (tons, 2,000 pounds).	Fuel oils (barrels).	Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).
	Anthracite (tons, 2,240 pounds).	Bituminous (tons, 2,000 pounds).						Anthracite (tons, 2,240 pounds).	Bituminous (tons, 2,000 pounds).				
United States.....	36,747	60,684	3,837	58,368	968	2,978,491	New York.....	18,161	2,996	2,740	19,795	104	1,327
Connecticut.....	137	12,930	533	5,937	367	4,240	Ohio.....		1,882	65	820	104	1,573
Massachusetts.....	40	13,366	451	2,077			Wisconsin.....		1,932			35	
							All other states.....	18,409	33,598	48	29,739	472	2,971,351

## SPECIAL STATISTICS.

The foregoing tables relating to ordnance and accessories give the general statistics for the 26 establishments assigned to this industry. There is, however, a very large production by establishments in other lines of manufacture for which the general statistics are included in the reports for the ammunition and firearms industries, for steel works and rolling mills, and likewise in certain of the general industries designated as foundry and machine-shop products, steel and electric railway cars, and agricultural implements. Table 35 gives the total production of ordnance and accessories by all establishments, whether manufactured as a primary or as a subsidiary product. There is included among accessories certain miscellaneous articles, such as periscopes, which were not segregated in the reports. There was a large production of gun forgings reported by steel plants which probably to a considerable

extent is duplicated in the finished ordnance products reported by other establishments. Of the finished guns here reported, approximately 60 per cent of the machine guns were produced by establishments engaged primarily in the manufacture of firearms and over one-half of the gun mounts and the like were products of establishments outside of the ordnance industry as here classified. An ordnance production of \$5,343,327 was reported by establishments included in the machine-shop industry, and a still larger amount came from establishments engaged primarily in the manufacture of steel and electric railway cars. These are all included in the item designated as "subsidiary products, ordnance and accessories, of other industries."

**Products, detailed statistics.**—The statistics of production are given in Table 35 with as much detail as is possible without disclosure of individual operations.



## MANUFACTURES.

TABLE 35.—PRODUCTS, DETAILED STATISTICS: 1919.

KIND.	Number of establishments.	Value.	KIND.	Number of establishments.	Value.
Total value.....		\$130,588,482	Ordinance and accessories—Continued.		
Ordinance and accessories, the industry.....	26	69,495,628	Carriages, caissons and limbers, not specified.....		\$10,200,212
Subsidiary products, ordinance and accessories, of other industries.....		61,092,854	Accessories and miscellaneous—		
Ordinance and accessories <sup>1</sup> .....		102,322,423	Spares for—		
Guns—			Machine guns.....	5	7,228,417
Machine guns <sup>2</sup> .....	5	15,577,704	Caissons, limbers, and wagons, axles and spindles.....		6,461,368
Naval guns (number 910).....		4,568,901	Gunfire control.....		2,443,311
Field guns <sup>3</sup> .....	3	704,827	Sights, lifting jacks, elevator dials, etc.....	7	1,808,630
Other guns.....		634,704	Other, including cases, bomb projectors, air compressors, coolers, periscopes, etc.....		7,029,302
Gun mounts—			Gun forgings (steel works).....	6	21,185,031
Naval and steel gun mounts.....	9	6,472,751	Ordinance not specified (steel works).....		6,387,592
Machine and antiaircraft mounts and sights.....		3,788,837	Ammunition, products of ordinance establishments.....		13,410,903
Gun mounts, kind not specified, and sights.....		7,877,876	Contract work.....		2,700,117
			All other products, not ordinance or accessories.....		12,146,039

<sup>1</sup> Not including products of 3 governmental establishments, \$52,041,750.<sup>2</sup> Includes 46,542 machine guns, value \$14,305,715 (unit value \$309); number not reported for \$1,212,049.<sup>3</sup> Includes 1,622 field guns, value \$541,427 (unit value \$350); number not reported for \$165,600.

## GENERAL TABLE.

Table 36 presents for 1919 the statistics in detail for the states for which figures can be shown without disclosure of individual operations.

TABLE 36.—DETAILED STATEMENT, BY STATES: 1919.

STATE.	Number of establishments.	PERSONS ENGAGED IN THE INDUSTRY.								WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.				EXPENSES.		
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks, etc.		Wage earners.			Total.	16 and over.			Capital.	Salaries and wages.	
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Under 16, male.		Officials.	Clerks, etc.
								Maximum month.	Minimum month.							
United States.....	26	13,600	3	440	1,249	580	11,328	Ja 19,435	Au 7,974	12,630	12,120	808	2	\$85,399,163	\$2,353,019	\$1,748,774
Connecticut.....	4	1,680	.....	80	92	65	1,443	Ap 2,753	Au 625	1,161	1,084	77	.....	15,988,439	486,303	218,500
Massachusetts.....	4	2,604	.....	128	421	250	1,805	Ja 3,937	Je 902	2,080	1,984	95	1	22,690,853	517,072	598,051
All other states <sup>1</sup> .....	18	9,316	3	232	736	265	8,080	.....	.....	9,689	9,052	636	1	46,719,871	1,390,644	932,223

STATE.	EXPENSES—continued.						Value of products.	Value added by manufacture.	POWER.						
	Salaries and wages—Continued.	For contract work.	Rent and taxes.		For materials.				Total.	Primary horsepower.					Electric horsepower generated in establishments reporting.
			Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.				Owned.	Rented (electric).				
												Steam engines (not turbines.)	Steam turbines.	Internal-combustion engines.	
United States.....	\$15,550,642	\$1,475	\$110,402	\$3,739,959	\$25,513,109	\$1,070,549	\$69,495,628	\$42,902,970	40,652	6,669	1,631	187	200	31,905	6,585
Connecticut.....	1,860,984	1,475	.....	251,485	5,209,038	126,513	11,696,554	6,361,003	5,073	1,625	.....	75	200	3,173	1,342
Massachusetts.....	2,789,639	.....	36,661	1,887,378	6,261,244	187,046	18,346,958	11,918,668	7,900	1,100	625	.....	.....	6,176	1,525
All other states <sup>1</sup> .....	10,906,069	.....	73,741	2,101,098	14,042,827	736,990	39,462,116	24,623,299	27,679	3,944	1,006	112	.....	22,617	3,718

<sup>1</sup> All other states embrace: Indiana, 1 establishment; Maryland, 1; Michigan, 2; New Jersey, 2; New York, 4; Ohio, 3; Pennsylvania, 2; and Wisconsin, 3.<sup>2</sup> Includes water wheels and turbines (irrespective of ownership of water supply).